VETERINARY DRUG SUPPLY TO SUBSISTENCE AND EMERGING FARMING COMMUNITIES IN THE MADIKWE DISTRICT, NORTH WEST PROVINCE, SOUTH AFRICA

By

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Submitted in partial fulfilment of the requirements for the degree

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Promoter: Prof. G.E. Swan

Co-promoter: Dr. R.D. Sykes

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SUMMARY

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Key terms: Veterinary medicinal products, supply, distribution, emerging and subsistence farmers, South Africa, Madikwe district, regulatory authorities

Veterinary Needs Appraisals have indicated that there is a need for improved supply of veterinary medicinal products to subsistence and emerging farmers in South Africa. No studies have been conducted to describe and assess the adequacy of the current routes and methods of supply of veterinary medicinal products to these farmers. A combination of focus groups, self-administered questionnaires and direct observations was used to collect information for the purpose of describing and understanding the situation regarding the

supply of veterinary medicinal products to the farmers of the Madikwe district. A combination of semi-structured interviews, questionnaires and direct observation was used to gather information. The results indicated that the routes and methods of supply of veterinary medicinal products to the farmers of the Madikwe district were inadequate. The annual sales from outlets within the Madikwe district were poor, with a total of 396 units sold over a period of one year, although there were approximately 2000 farmers in the Madikwe district who were potential clients for these outlets. The majority of products sold by these outlets were ectoparasiticides, followed by Tetracycline antibiotics. The outlets within the Madikwe district were unable to supply vaccines, as they did not have adequate facilities for the storage of these thermolabile products. Farmers had to travel an average of 70 km if they wished to purchase veterinary medicinal products from farmers' co-operatives and pharmacies in larger towns outside the Madikwe district. The routes and methods of supply did not ensure correct storage, and safe and effective use of veterinary medicinal products. Several examples of misuse and incorrect storage and handling of veterinary medicinal products were discovered. Inadequate information transfer, inaccessibility of outlets, poor reliability and quality of outlets and poor service were discovered as reasons for the inadequacy of the routes and methods of supply. Wider distribution of veterinary medicinal products is required but a higher level of control is needed to ensure that products of an acceptable quality are sold. Information and advice must be disseminated together with products.

OPSOMMING

VERSKAFFING VAN VETERINêRE MEDISYNES AAN SELFVERSORGENDE EN OPKOMENDE BOEREGEMEENSKAPPE VAN DIE MADIKWE DISTRIK VAN DIE NOORDWES PROVINSIE VAN SUID-AFRIKA

Deur

Ronette Gehring

Voorgelê ter gedeeltelike vervulling van die vereistes vir graad

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Evaluering van veeartsenykundige benodigdhede het getoon dat daar 'n behoefte bestaan vir verbeterde voorsiening van veterinêre medisinale produkte aan bestaans- en opkomende boere in Suid-Afrika. Geen studies is al voorheen onderneem om te bepaal of die huidige roetes en metodes van verskaffing van veterinêre medisinale produkte aan hierdie boere voldoende is nie. 'n Kombinasie van fokus-groepe, self-geadministreerde vraelyste en direkte observasie is gebruik om inligting in te win met die doel om insig te

verkry oor die voorsiening van veterinêre medisinale produkte aan die boere van die Madikwe distrik. 'n Kombinasie van gedeeltelik gestruktureerde onderhoude, vraeboë en direkte waarneming is gebruik om inligting te bekom. Die resultate het getoon dat die roetes en metodes om veterinêre medisinale produkte aan die boere van die Madikwe distrik te verskaf ontoereikend is. Die jaarlikse verkope deur afsetpunte in die Madikwe distrik was swak, met 'n totaal van slegs 396 eenhede verkoop in die periode van een jaar, in vergelyking met die ongeveer 2000 boere in die Madikwe distrik wat potensiële kliënte vir die afsetpunte was. Die meerderheid produkte wat deur die afsetpunte verkoop is was uitwendige parasietdoders, gevolg deur Tetrasiklien antibiotika. Die afsetpunte in die Madikwe distrik was nie in staat om entstowwe aan die boere te verskaf nie, aangesien hulle nie voldoende fasiliteite vir die stoor van hierdie hittesensitiewe produkte gehad het nie. Boere moes gemiddeld 70 km reis as hulle veterinêre medisinale produkte by boere ko-öperasies en apteke in groter dorpe buite die Madikwe distrik moes koop. Die roetes en metodes van verskaffing het nie verseker dat korrekte berging en veilige en effektiewe gebruik van veterinêre medisinale produkte aangewend is nie. Verskeie voorbeelde van wangebruik en verkeerde berging en hantering van veterinêre medisinale produkte is waargeneem. Ontoereikende informasie oordrag, onbereikbaarheid van afsetpunte, swak betroubaarheid en kwaliteit van diens by die afsetpunte was vasgestel as redes vir die ontoereikendheid van die roetes en metodes van verskaffing. 'n Wyer distribusie van veterinêre medisinale produkte is nodig, maar strenger beheer moet uitgeoefen word om te verseker dat produkte van 'n aanvaarbare kwaliteit verkoop word. Inligting en advies moet ook saam met produkte verskaf word.

CHAPTER ONE

GENERAL INTRODUCTION

1.1 INTRODUCTION

A veterinary drug can be defined as "any substance used in the diagnosis, mitigation, treatment or prevention of disease in animals" (Davis 1988). It also refers to "any substance that is used for the maintenance or improvement of health, growth, production or working capacity or for the lasting capacity of carcasses, or for curing, correcting or modifying any somatic or organic function, or for correcting or modifying behaviour" (Draft of the National Veterinary Drug Policy, 1997).

Throughout history, man has used drugs both for himself and his animals, not just to treat disease but also for various social and religious purposes. The earliest drugs were of plant, animal or mineral origin and were substances that people found in their environment. As knowledge about these substances grew through experience, oral traditions and folklore developed around their use. The Chinese were the first people to compile a written record of the drugs they used in the form of the Chinese Herbal or the *Pen Tsao* (Davis 1988).

Today, the mechanisms by which many drugs can change the structure or function of the body have been elucidated and therapeutics is based on scientific principles. The science

of organic chemistry has removed our dependence on natural substances as a source of drugs and has provided many new synthetic molecules with medicinal properties. These developments have led to a phenomenal growth in the number of drugs available to treat the various diseases and ailments that affect both man and his animals (Davis 1988).

These developments have also led to the growth of a pharmaceutical industry. Originally, the healer would have prepared the drug for the patient himself and many of the ingredients were readily available in the environment. As drugs have become more sophisticated, only specialised industries are able to produce them. Sometimes there are even a number of industries producing the different components of the product. Specialised knowledge has become necessary to use these sophisticated drugs safely and effectively (Blum, Herxheimer, Stenzl and Woodcock 1981).

Governments have established regulations that control the manufacture, use and supply of drugs. These regulations are to protect the public, but they limit the access that farmers have to certain products, as these are only available through suitably qualified people who are able to advise on the correct use of the product (Blum, Herxheimer, Stenzl and Woodcock 1981). The health and production of livestock may be negatively affected if farmers do not have access to veterinary drugs.

A study was undertaken to evaluate the adequacy of the current routes and methods of supply of veterinary medicinal products to subsistence and emerging farmers of the Madikwe District of the North West Province.

1.2 DEFINITIONS

Veterinary medicinal products: To avoid confusion between the terms Veterinary Medicines, Veterinary Drugs and Stock Remedies as referred to in the different Acts controlling the supply of veterinary drugs in South Africa, the term Veterinary Medicinal Products will be used in this dissertation. This term is used to refer to all veterinary drugs that conform to the definition of Davis referred to above.

Subsistence and emerging farmers: These terms are used to refer to farmers of the small-scale, subsistence-orientated farming communities in South Africa that are situated in the former homelands. Some of these farmers only produce enough for their own needs and the needs of their families. These will be referred to as *subsistence* farmers. Others produce an excess, which they may sell to generate an income, however they cannot yet be considered to be commercial farmers. These farmers will be referred to as *emerging* farmers in this dissertation.

Outlets: All points of distribution of veterinary medicinal products to farmers will be referred to as *outlets* in this dissertation. These may include veterinary clinics, pharmacies, farmers' co-operatives or any other retail outlet. Individual types of outlets will be described as they are encountered in the dissertation.

Farmers' co-operative: This term, as used in this dissertation, refers to retail outlets in towns throughout South Africa that specialise in the sale of products commonly required

by commercial farmers (e.g., livestock feeds, seeds for crops, farming implements and certain veterinary medicinal products).

1.3 HYPOTHESIS

The current methods and routes of supply of veterinary medicinal products to the farmers of the Madikwe District are not appropriate and do not meet their needs.

1.4 OBJECTIVES

1.4.1 Primary Objective

To describe and assess the adequacy of the current routes and methods of supply of veterinary medicinal products to the subsistence and emerging farmers of the Madikwe District.

1.4.2 Secondary Objectives

- To assess the suitability of current packaging, formulation types and information formats for supply to subsistence and emerging farmers.
- To assess the ability of farmers to handle veterinary medicinal products correctly and administer them safely and effectively.
- To develop an effective and efficient method to assess the adequacy of supply of veterinary medicinal products that can be applied to other areas throughout South Africa.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Livestock ownership and production plays an important economic and cultural role in the rural communities of South and southern Africa (Coetzer 1996, Umali, Feder and de Haan 1994). Not only are these animals a source of protein-rich food, transport, draught power, investment and money, but cattle in particular also play an important role in cultural and social affairs of these communities. The health and well-being of livestock is therefore important to these communities.

There are a number of constraints to increased livestock production in southern Africa. These constraints include the availability of natural resources as well as the large number of infectious diseases and parasites (Coetzer, Thomson and Tustin 1994, Coetzer 1996, de Jager 1996). Tables 2.1 to 2.3 summarize the most important infectious and parasitic diseases of cattle, sheep and goats in South Africa, as listed by Coetzer at the Second All Africa Conference on Animal Agriculture in 1996.

Table 2.1: Important infectious and parasitic diseases of cattle in South Africa

Considered to be very important	Also for possible consideration
Foot-and-Mouth Disease	Brucellosis
Heartwater	Bovine genital campylobacteriosis
Babesiosis	Bovine Respiratory Disease Complex
Lumpy skin disease	Tuberculosis
Rift Valley Fever	Blackquarter
Mastitis	Botulism
Cysticercosis	Colibacillosis
Tick worry	Bovine salmonellosis
Nematodosis	Bovine foot rot
Anaplasmosis	*Actinomyces pyogenes* infection
Anthrax*	

* Occurs rarely in South Africa but of great importance in other southern African countries

Table 2.2: Important infectious and parasitic diseases of sheep in South Africa

Considered to be very important	Also for possible consideration
Haemonchosis and other nematodoses	Jaagsiekte
Pulpy kidney	Maedni-Visna
Heartwater	Orf
Bluetongue	*Brucella ovis* infection
Rift Valley Fever	*Actinobacillus seminis* infection
Psoroptes mange	Pasteurellosis
Simulium midges	Foot rot
Coccidiosis	Malignant oedema
Fasciolosis	Tetanus
Caseous lymphadenitis	Botulism
	Tick worry

Table 2.3: Important infectious and parasitic diseases of goats in South Africa

Considered to be very important	Also for possible consideration
Heartwater	Caseous lymphadenitis
Coccidiosis	Nematodosis
Orf	Lice
Pasteurellosis	Ticks

The necessity to develop and manufacture appropriate preventative and curative technologies and veterinary medicines to improve the health and production of livestock in developing countries has been recognised. These must then also be delivered to farmers at a realistic cost (Julian 1990).

The pharmaceutical industry, veterinarians, paraveterinary professionals, pharmacists and the drug regulatory authorities all play a role in the delivery of veterinary medicinal products to farmers (Blum, Herxheimer, Stenzl and Woodcock 1981; Swan, Sykes and Schlebusch 1994; Swan 1997). The pharmaceutical industry develops, markets and distributes veterinary medicinal products whereas veterinarians must ensure the judicious and safe use of these products through accurate diagnosis and by providing advice on how these products should be handled and administered. The drug regulatory authorities, by formulating and enforcing regulations, ultimately control the manufacture, access, supply and use of veterinary medicinal products.

2.2 LEGISLATION AND REGULATION OF THE SUPPLY OF VETERINARY MEDICINAL PRODUCTS

There are a number of regulatory systems worldwide that control the manufacture, use, access and supply of veterinary medicinal products (Swan, Sykes and Schlebusch 1994; Swan 1997). These regulations serve to protect the public. They are essential to ensure the safety of the drug to the target animal, consumer, handler of the drug and the environment, as well as the quality and efficacy of these products.

2.2.1 International perspective

The past two decades have seen a move towards the international harmonisation of the regulatory control of veterinary medicinal products (Blancou 1995, Sundlof 1995, Sykes 1997). The aim of these efforts is to promote the exchange of knowledge and expertise and in this way increase the availability of affordable products of adequate quality with the ultimate goal to improve livestock production and enhance food security.

Since its inception in 1995, the World Trade Organisation (WTO) has worked towards the liberalisation of world trade by breaking down trade barriers (Jukes 2000). This has opened many markets for agricultural products from the developing world. However, the Sanitary and Phytosanitary Agreement (SPS Agreement) of the WTO recognizes the right of members to protect human, animal or plant life from risks arising from additives, contaminants, toxins or disease-causing organisms in food, beverages or feedstuffs. Since veterinary medicinal products are a source of contaminants in food of animal origin, a number of standards, recommendations and guidelines have been developed with which countries need to comply if they wish to maintain free trading relations with member countries (Fidler 1998). This has led to a number of organisations developing guidelines and standards regarding the control of veterinary medicinal products. These organisations include the Veterinary International Commission for Harmonization (VICH), Codex Alimentarius and the Office Internationale des Epizooties (OIE). Certain of these guidelines pertain to the availability and distribution of veterinary medicinal products to ensure adequate control over the safe and effective use of these products.

The following recommendations regarding the distribution of veterinary medicinal products were published by the OIE in their Drug Registration Newsletter (*Anon.* 1995):

- *The distribution of veterinary medicinal products and drug substances intended for use in veterinary medicinal products should take place only through officially authorised channels.*
- *Specific criteria (as for example the need for a preparatory diagnosis) should be used to determine the prescription status of a drug or category of drugs used in veterinary medicine.*
- *The primary basis for assigning a product with non-prescription status should be the ability to label products with adequate directions for safe and effective use by non-veterinarians.*
- *Distribution policies should be linked to regulations, which ensure correct storage, and safe and effective conditions of use.*

The worldwide concern about the development of resistance to antimicrobial agents has led to the development of guidelines that restrict the distribution of these substances used for veterinary purposes. The draft of the OIE Technical Guidelines for the Responsible and Prudent use of Antimicrobial Agents in Veterinary Medicine lists the following conditions for the distribution of antimicrobial agents (Anon. 2000):

The relevant authorities should, where possible, make sure that all the anitmicrobial agents used in food animals are:

- *Prescribed by a veterinarian*
- *Delivered by an authorised animal health professional*
- *Supplied only through licensed/ authorised distribution systems*
- *Administered to animals by a veterinarian or, under the supervision of a veterinarian, or by his/her agent*

The importance of education and dissemination of information was also highlighted in this guideline document (Anon. 2000). The purpose of such initiatives would be to promote the prudent use of antimicrobials and create awareness of the development of antimicrobial resistance.

In developed countries veterinary medicines are mainly distributed through pharmacists and veterinarians. The schedule of the drug will determine whether a veterinary prescription is needed to authorise a pharmacist to supply the drug to an animal owner. However, in some countries (UK, USA and Japan), certain drugs are exempted from prescription-only status and can be sold by registered agricultural dealers/ drug merchants (Parodi 1994).

2.2.2 International Guidelines for developing countries

The international community has recognised that restricting the distribution of veterinary medicinal products to pharmacists and veterinarians is not practical in developing countries, due to a shortage of members of these professions; and that stringent regulations could have a detrimental effect on the health and production of livestock in these countries (Lobry

1989). It has been suggested that this problem be addressed by making products available through animal husbandry assistants, paraveterinary professionals and even livestock owners themselves. This system would, however, have to be accompanied by appropriate legislation and programmes to improve the education of the livestock owners.

It has been suggested that the most important products for farmers at the subsistence level would be vaccines and antiparasitics. By using vaccines, major diseases (e.g. rinderpest and foot-and-mouth disease) can be controlled and sporadic outbreaks of enzootic infections (e.g. anthrax, blackquarter, and pasteurellosis), which could have devastating consequences for the farmer, can be prevented. Ectoparasiticides will help prevent arthropod-borne disease and improve the well-being of the animals, whereas endoparasiticides will also help to improve the health and well-being of worm-infested animals. Certain specific chemotherapeutic agents such as Tetracycline antibiotics, antibabesials and trypanocides are also very important in areas where diseases occur that are caused by organisms that are susceptible to these agents. As the level of animal production increases, the farmers' need for other chemotherapeutic agents, vitamins, feed additives and growth promotants will increase (Lobry 1989).

In most developing countries, particularly in Africa, state veterinary services play a dominant role in animal disease control. Veterinary medicinal products are often distributed free of charge by the government and livestock owners benefit from the advice of State officials. This policy places grave burdens on State budgets and many feel that it does not foster a conscientious and responsible attitude towards livestock ownership. This has led many countries to change their policies towards the privatisation of veterinary services and the liberalisation of the veterinary medicines trade (Lobry 1989).

Veterinary services can be classified as 'public good' or 'private good' (Leonard, Koma, Ly and Woods 1999). When access can easily be denied to those who have not paid for a service and if two consumers cannot enjoy the benefit of the service at the same time, the service is classified as being 'private good'. Benefits from services classified as 'public good' spill over to other members of the community who have not paid for that service. It would be economically optimal for services classified as 'private good' to be delivered by the private sector, whereas services classified as 'public good' would generally be provided by the State.

Veterinary medicinal products can generally be considered to be 'private good', since those who do not pay for the product can be excluded from receiving benefit. (exceptions would be certain vaccines and products for economically devastating livestock diseases). However, modest demand coupled with tremendous distances in rural areas make the total privatisation of any veterinary service very difficult in developing countries. The management of private good services by the public sector can be acceptable if economies of scale are an important consideration or if sophisticated expertise or equipment is needed. However, in such cases the services should ideally be financed by direct payment from the beneficiaries and not from general revenue (De Haan and Bekure 1991).

The supply of veterinary medicinal products should be regulated at two levels (Leonard, Koma, Ly and Woods 1999). Firstly, it must be decided whether a product should be registered for distribution in a country at all. Secondly, it must be decided under which conditions these products are sold and to whom they may be sold (Leonard, Koma, Ly and Woods 1999). To exercise this type of control, the sale of certain products must be restricted, requiring a prescription from a veterinarian.

According to Leonard, Koma, Ly and Woods (1999), products requiring a veterinary prescription would include those in which:

- misuse could be dangerous,
- the improper dosage could create resistance (e.g. antimicrobials),
- a cold chain needs to be maintained (e.g. vaccines), and
- there is a risk of confusing clinical signs of mild and serious inflictions/ a diagnosis is not always easy to make, so that the advice of a professional is needed.

In some African countries, pharmaceutical supply has been completely liberalised and veterinary medicinal products are available at any rural shop (e.g. Nigeria, Madagascar and Tanzania) (Dina and Arowolo 1991, Leonard, Koma, Ly and Woods 1999). The lack of regulation of veterinary medicinal product supply creates the opportunity for illegal trade, allowing counterfeit medicines of unknown quality, efficacy and safety to enter the market (Dina and Arowolo 1991). However, it has also been noted that restricting the supply of veterinary medicinal products can stimulate illegal trade, particularly if authorised channels are unable to deliver services adequately, as farmers seek alternative sources for these products (De Haan and Bekure 1991).

Some veterinary medicinal products are difficult to manage, as they need thermal control, protection from light and have a limited shelf-life. Because they form only a small part of the total inventory of rural shops, there may be little incentive to manage them properly. Furthermore, veterinary medicinal products that are distributed widely by non-professionals may not be accompanied by the necessary advice. However, for products that are used to

treat or prevent economically important diseases that occur commonly in a particular area, the benefits of increased availability could outweigh this disadvantage (Leonard, Koma, Ly and Woods 1999).

Dina and Arowolo reported in 1991 that the use of veterinary medicinal products without the supervision of a veterinarian led to the misuse of these products in Nigeria. The most common patterns of misuse mentioned by these authors were underdosing and incomplete treatment regimens. Misused products included diminazene aceturate, several antibiotics and anthelmintics.

It has been proposed that two categories of products be established in developing countries. One category for restricted distribution (or requiring a veterinary prescription), and a second category of products for wider distribution by pharmacies, breeders' groups, co-operatives or other traders (Lobry 1989). Under such a system, criteria such as safety of the product to the animal or handler or the consumer of animal products containing harmful drug residues would need to be considered when placing veterinary medicinal products in one of these two categories (Lobry and Boisseau 1990).

2.2.3 Current legislation in South Africa

Veterinary products in South Africa are currently registered under two Acts viz.:

- The Medicines and Related Substances Control Act, 1965 (Act No. 101 of 1965), administered by the Department of Health (Veterinary Medicines)
- The Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947), administered by the National Department of Agriculture (stock remedies).

Veterinary medicines, like all other medicinal substances are grouped into various schedules (unscheduled – Schedule 9) based on their safety, use and habit-forming potential (Swan, Sykes and Schlebusch 1997).

Unscheduled medicines and stock remedies are over-the-counter (OTC) products and are legally available directly to the public from any retail outlet. Pharmacists may supply any medicine up to Schedule 2 and stock remedies directly to clients for use in animals without a veterinary prescription. A veterinary prescription is required for all other scheduled substances (Swan, Sykes and Schlebusch 1997).

Stock remedies provide a readily available and affordable source of products for the treatment of economically important diseases that can be diagnosed by the farmer. Farmers are assumed to have a fair knowledge of animal husbandry. The indications and instructions for the use of stock remedies must be clearly stipulated on the label of these products, which are submitted for approval to the regulatory authority. The user of a Stock Remedy (other than a veterinarian) may not deviate from the requirements and instructions as indicated on the label. A Stock Remedy may only be sold in its original pack, except when sold by a pharmacist on prescription of a veterinarian or by a veterinarian (Swan, Sykes and Schlebusch 1997, Swan 1997)

Historically, Act 36/47 controlled drugs registered for use in animals, most of these being for the control of parasites (both external and internal). Due to the scarcity of professional services, the variety of products that were made available to farmers over the counter was increased to include certain antibiotics, intra-mammary preparations and other products essential for livestock health (Sykes 1995).

A large number of sophisticated veterinary products, requiring professional expertise to use safely and effectively, entered the market during the sixties and seventies. In 1965 Act 101/65 was promulgated, but it was not empowered to control Veterinary Medicines. In 1977 Act 101/65 was amended to include Veterinary Medicines but it was not until 1983 that Veterinary Medicines were registered under this Act and came under the control of the Minister of Health (Sykes 1995).

The fact that two authorities are involved in the registration and control of veterinary products and that the standards of evaluation, registration and control vary, causes considerable difficulties and problems. This has led to the creation of the Veterinary Products Policy Committee of the Medicines Control Council (MCC). This committee has defined as part of its goal, the creation and maintenance of a single control system for all Veterinary Products (Sykes 1995).

2.2.4 The National Veterinary Drug Policy (NVDP)

The Veterinary Products Policy Committee of the (MCC) (administered by the Department of Health) drafted the National Veterinary Drug Policy (NVDP) in 1997. The NVDP aims to encourage and contribute to the ready availability of safe, cost-effective veterinary drugs of acceptable quality for all segments of the South African animal health market.

The general objectives of the NVDP which support increased availability of veterinary medicines of acceptable quality are:

- To ensure the efficacy, safety to the target species, user, consumer and environment, and quality of veterinary drugs available in South Africa,
- To facilitate the introduction and availability of safe and effective drugs on the South

African market by avoiding the application of restrictive measures, and

- To establish the appropriate routes of administration and consequent labelling requirements with the aim of ensuring maximum availability and safe use of the product.

To achieve these general objectives the NVDP aims to:

- Offer a system for improving the safe, effective distribution and use of veterinary drugs essential for achieving food security and protecting human health,
- Facilitate the design, production and implementation of appropriate educational programmes for human resource development on animal health care, and
- Lower the cost of veterinary drugs in both the public and private sectors.

To help achieve these objectives it has been proposed that an additional category of sale of veterinary drugs known as Animal Health Products (AHPs) should be established. According to the Veterinary Drug Policy, veterinary drugs would then be scheduled into three basic categories:

Over the Counter Products (OTC)

These products can be applied or used without any professional guidance on the directions for use for effective control of animal health conditions. These products would be classified as Schedule 0.

Animal Health Products (AHP's)

The following categories of products would be described as AHP's and classified as Schedule S:

- Veterinary drugs used for the treatment of specific stock diseases that can be readily diagnosed by the farmer,
- Veterinary drugs and biologicals used for prophylactic purposes for the prevention and control of diseases in food-producing animals,
- Veterinary drugs used for the enhancement of production in food-producing animals, and
- Veterinary drugs used for the control and prevention of diseases in the communal environment and zoonotic diseases.

In considering such drugs the following principles apply:

- Human safety implications,
- Environmental impact,
- Simplicity and ease of use of the drug, and
- Experience of particular drugs under local conditions.

According to these criteria, a veterinary medicinal product is selected generically or only for certain indications and/ or species.

AHPs would be made available for widespread use for specific conditions. Distribution of these products would take place through Authorised Dealers. Authorised Dealers would need to comply with standards and regulations controlling the sale, distribution and secure storage of AHP's. Their premises will need to comply with minimum guidelines laid down

in the regulations pertaining to veterinary medicinal products. The staff would need to be suitably qualified and able to advise animal health workers, farmers and the public on the use of AHP's.

Veterinary Medicines

All other veterinary drugs would be classified as Veterinary Medicines. Veterinary Medicines will then be classified into Schedules 1 to 7, according to the guidance required on the directions for use and the specific instructions for the dispensing and application of the drug, as contained in Act 101/ 65.

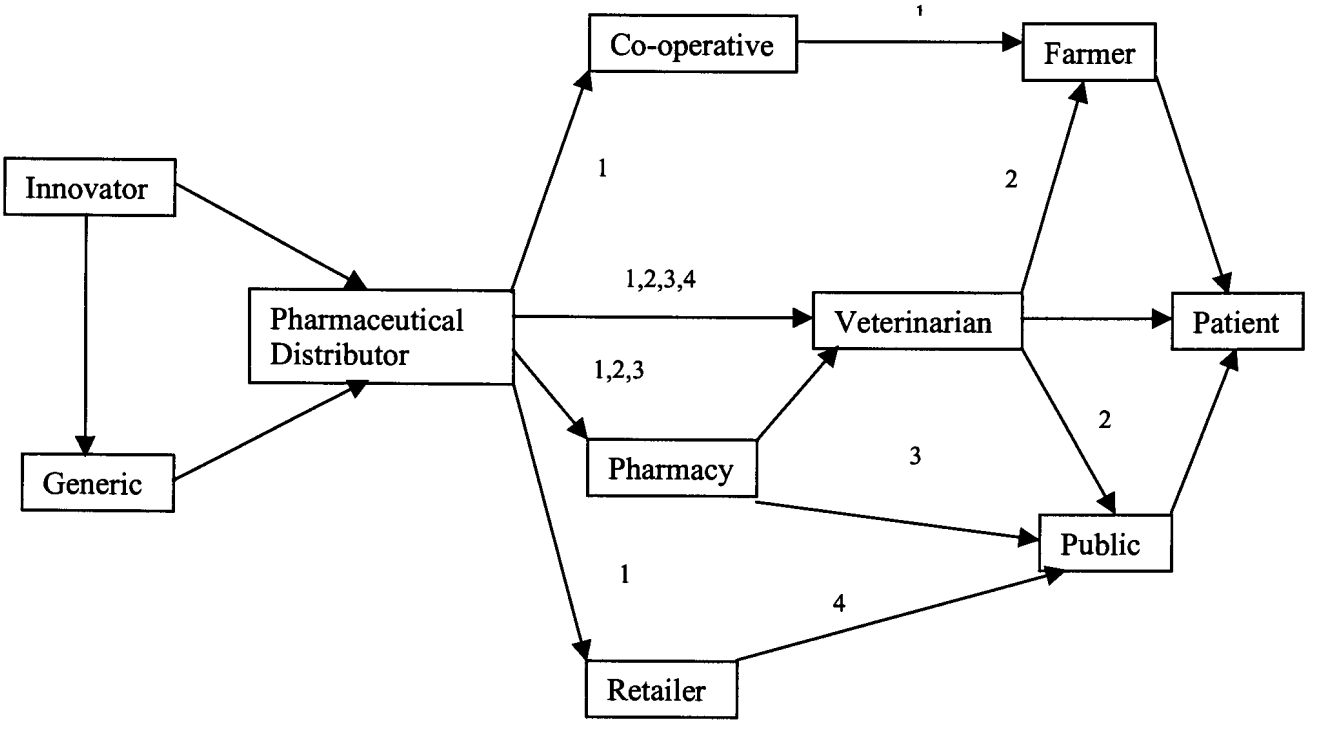
The South African Medicines and Medical Devices Regulatory Authority (SAMMDRA) Act (Act 132/98) was promulgated in 1998. This provided an opportunity to incorporate the registration of veterinary medicines and stock remedies into a single act, as well as the achieving the other objectives of the NVDP. In terms of this Act, it was planned to categorise veterinary medicines into Schedules 0 to 7. Stock remedies would be listed as Animal Health Products under Annexure A and pesticide stock remedies would be listed under Annexure B in Schedule 0. It was then proposed to revisit the stock remedies in the future and separate them into either Schedule 0 veterinary medicines without any restrictions on supply (thus open shop), Animal Health Products to be made available only through approved Authorised Dealers or they would be placed in higher schedules for supply under the prescription of a veterinarian only.

Unfortunately the SAMMDRA Act was set aside by the constitutional court and sent back to parliament for reconsideration (Dr R.D Sykes, personal communication, May 2000). This has delayed the Veterinary Products Policy Committee in achieving its goals.

2.2.5 Current routes of supply of Veterinary Medicinal Products in South Africa

Veterinary services in South Africa are divided into private and public sectors. The private veterinary service serves the needs of individuals whereas the public veterinary service and system of disease control serves the needs of all communities on a national basis. These public veterinary services may also be offered through welfare organizations.

Most commercial farmers in South Africa make use of private veterinary services. In the private sector, veterinary medicinal products are supplied via the manufacturer and distributor to pharmacists as well as directly to veterinarians and members of other health professions. The product then reaches the public through the pharmacist or veterinarian. Depending on the scheduling status of the product, a veterinary prescription may be required before a drug can be supplied to the public. As mentioned earlier, certain drugs are exempted from scheduling and are available directly to the public via farmer co-operatives and or any other retail outlet as stock remedies. The routes of supply of veterinary medicinal products are summarised in Figure 2.1.



1 = Stock Remedies 2 = Schedule 1-7 Veterinary Medicines

3 = Schedule 1-2 Veterinary Medicines 4 = Unscheduled Veterinary Medicines

Figure 2.1: Summary of the current routes of supply of veterinary medicinal products in South Africa (from: Prof. G.E. Swan, Department of Pharmacology and Toxicology, University of Pretoria, Onderstepoort).

2.3 EMERGING FARMERS IN SOUTH AFRICA

Agriculture in South Africa can be broadly divided into surplus-producing, commercially orientated and capital-intensive farming communities and small-scale, subsistence-oriented farming communities that are situated in the former homelands or national states (Van Zyl and van Rooyen 1991). For many years, agricultural and veterinary research in South Africa focused on the needs of the commercial farmers (Dreyer, Fourie and Kok 1999).

Since the national elections in 1994, the new government has realised the need for development aid for small-scale farmers to stimulate the development of an emerging class of commercial farmers (Mather 1996).

A number of studies have been done to characterise these resource-poor, small-scale farmers and to describe their veterinary needs (McCrindle, Tice, Mogajane, Stewart and Mosupi 1994; Krecek, Cornelius and McCrindle 1995; Dreyer, Fourie and Kok 1999; Letsoalo, Krecek, Botha and Ngetu 2000).

These studies show that:

- A large number of these farmers are in the former homelands (e.g. Bophuthatswana),
- Most of these farmers make use of communal grazing for their livestock,
- These farmers may be situated in rural, semi-rural as well as peri-urban areas,
- Unemployment rates are high in these areas,
- There is a moderate to high level of illiteracy in these areas,
- The most commonly kept production animals are cattle, goats and chickens,
- Many of the inhabitants of these areas also keep dogs and donkeys, and
- The average farmer owns few animals (approximately ten in most studies).

2.3.1 The Madikwe District of the Northwest Province

The Madikwe district is located in a former homeland that was known as Bophuthatswana, and is 298 744 ha in size. The district is sparsely populated and is mainly comprised of tribal villages. Pella and Tlokweng/Silwerkrans are the two largest tribal villages with populations respectively of 9 216 and 13 353 (see Figure 2.2). Madikwe Town (population

3 734), the only centre considered to be urban, is located some 105 km east of Mmabatho and 75 km north west of Rustenburg and 180 km north west of Johannesburg (Bosman 1995).

The positions and populations of the villages and towns of the Madikwe district are illustrated in Figure 2.2.

Infrastructure in the Madikwe district is poor. Water supply is mainly by means of communal taps or boreholes. Most households do not have electricity and use paraffin or wood for cooking, lighting and heating. A large proportion of households (82%) own at least a radio, whereas only about a 30% own both a radio and a television (Bosman 1995).

The climate is arid with erratic and variable rainfall in the summer months (average annual rainfall is about 670 mm). Summers are hot with thundershowers and winters are cold. The natural vegetation consists of the following four Bushveld veld types (Acocks 1988):

Other Turf Thornveld

Kalahari Thornveld

Mixed Bushveld

Sourish Mixed Bushveld

Most of the area is suitable for livestock grazing. Extensive livestock production is the most viable agricultural activity in the district.

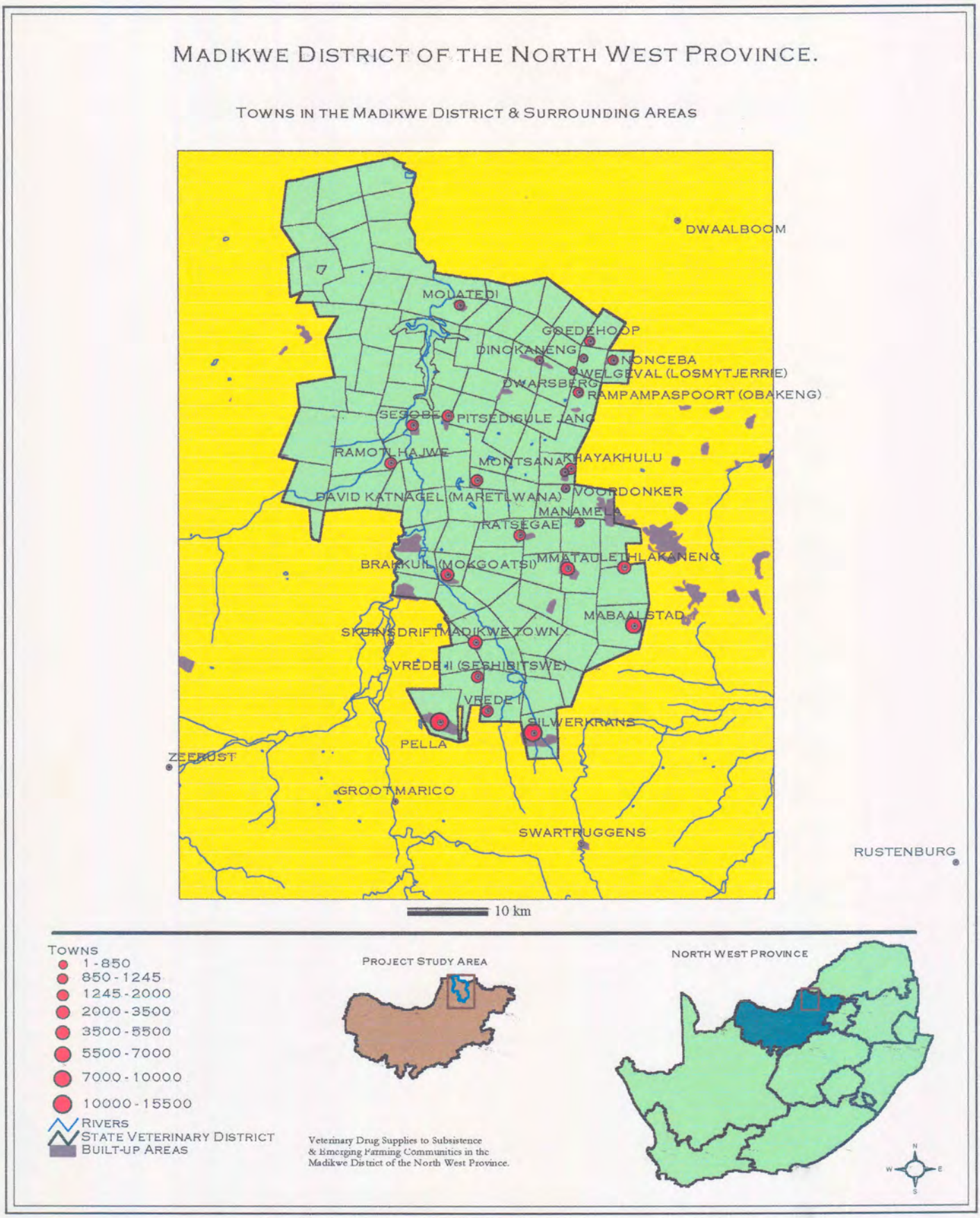


Figure 2.2: The Madikwe District of the North West Province

Agriculture is an important activity in the district with just over 90% of the land (268 869 ha) being used for this purpose (Bosman 1995). Two percent of the total income for the district comes from agriculture (own farming, not through employment on farms) (Development Research 1993). About 70% of households are involved in some form of agricultural activity (*viz.* livestock production, crop production or vegetable production). The exact proportions vary throughout the district, with less involvement in the more urban areas. Of these activities, livestock production is definitely the most popular, with just over half the households in the district involved in this form of agriculture (Bosman 1995).

The majority of livestock kept in the Madikwe district is cattle. According to the Annual report of the Directorate of Veterinary Services for the period 1st January to 31st December 1998 there are 38 000 cattle in the district. This is followed by goats and then sheep (see Figure 2.3). The poultry population has declined drastically during recent years, most likely due to outbreaks of Newcastle's disease (Bosman 1995, Department of Agriculture North West Province 1998).

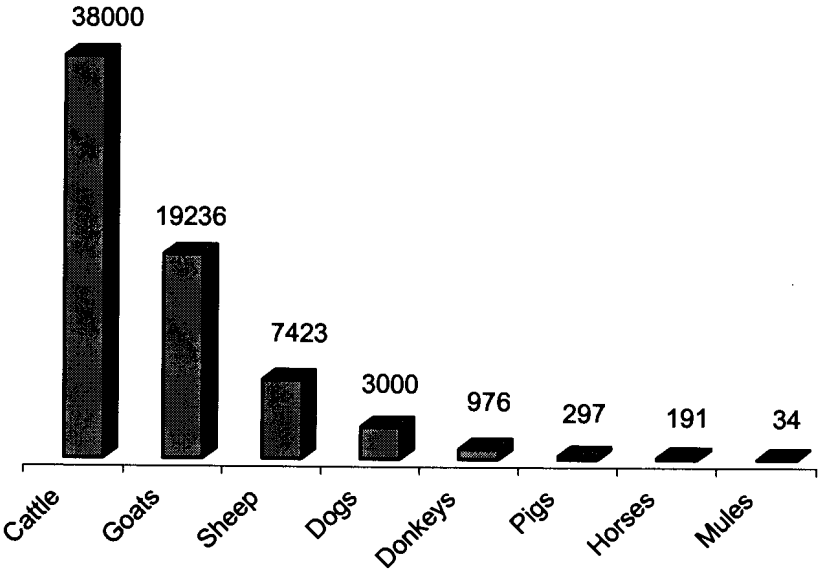


Figure 2.3: Estimated livestock numbers in the Madikwe district (from: Annual report of the Directorate of Veterinary Services for the period 1st January to 31st December 1998)

There are approximately 2 000 communal and 60 commercial farmers in the Madikwe District. The number of cattle owned by each farmer ranges from five to three hundred, with the commercial farmers owning at least two hundred animals each (Mr K D Moichwanetse *pers. comm.*, 2000).

The communal farmers live in the tribal villages and graze their animals on surrounding communal land. Some of this land has been divided into camps, which are shared by three to five farmers. Other farmers allow their animals to graze on open land that has not been divided into camps. These farmers will kraal their animals at night (Mr K D Moichwanetse *pers. comm.*, 2000).

Farmers have built cattle posts in the camps with kraals for their animals. The farmers appoint a 'headman' or herdsman who lives at the cattle post and cares for their animals. The headman is usually a member of their family (Mr K D Moichwanetse *pers. comm.*, 2000). Most farmers (88%) used unpaid members of their household to care for the animals (Bosman 1995).

During the socio-economic survey of the region, conducted by Bosman in 1994, farmers cited the following reasons for keeping cattle, in decreasing order of importance:

- Wealth accumulation,
- Source of income,
- Milk production,
- Home consumption,
- Ceremonial/ Traditional, and
- Transport/ Traction.

The first four reasons are concerned with income generation and food security. These together accounted for more than 80% of the reasons cited by farmers for keeping cattle (Bosman 1995).

During the same survey, farmers listed the following problems, also in decreasing order of importance, as hindrances to improving livestock production:

- Shortage of grazing,
- Illness/ disease,

- Lack of water,
- Lack of veterinary services,
- Lack of extension services,
- Lack of marketing services,
- Lack of camps, and
- Theft.

The farmers do not seem to regard overstocking and overgrazing as a fundamental problem, which makes it unclear whether more grazing land would lead to normal stocking rates. Note that stock diseases rank second only to shortage of grazing (Bosman 1995).

Most inhabitants of the Madikwe district are poor. In 1994, only one percent of the population earned more than R800,00 per month (Minimum Living Level was considered to be R791,55 per month according to the Bureau for Market Research, UNISA). This poor financial situation is coupled with low levels of education and employment. Unemployment was the highest in the 25-34 year age bracket (Bosman found only 11% of this age group to be employed in 1994). Due to the lack of employment prospects in the district, there is a tendency for the economically active part of the population to seek opportunities elsewhere (Bosman 1995). The number of these out-migrants was relatively low, but Bosman expected it to increase in the future.

Education and literacy is low amongst the people of the Madikwe district. Thirty six percent of the adult population is illiterate (Development Research 1993). Improvement in education in the recent past means that the younger members are better educated than the older age groups (Bosman 1995).

2.3.2 The Tswana

The Tswana are a group of Bantu-speaking people that have settled in Botswana and in the area of ex-Bophuthatswana. They are part of the larger group, the Sotho, which is divided into three sub-groups, the Northern Sotho, Southern Sotho and Tswana mainly on linguistic grounds. The Tswana are further divided into three large groups, the Rolong, the Hurutshe and the Kwena. The inhabitants of the Madikwe district are members of a sub-group of the Hurutshe, the boMakgatla (Harman 1984).

The community life of the Tswana is based on a system of kinship groups. The basic kinship group comprises a husband, wife and their children. If the husband has more than one wife, the unit of a man, his wives and their children form a household that live together on one homestead comprised of various huts around a common yard or inner court. Each wife has her own house and associated furniture, cattle and fields. Polygamy is, however, no longer frequently practiced (Harman 1984).

Related households form a family group that live near each other and acknowledge a common senior male person as their head. A number of related family groups form a lineage group. Ultimately, the most comprehensive kinship group is a totemic group that is associated with a certain object or animal, called a totem (Harman 1984).

Various formalities and negotiations between the family groups of the man and the woman accompany marriage. Marriage goods, often in the form of cattle but sometimes also goats, sheep or other objects, are an important part of the contract and are offered by the family group of the man to the family of the woman (Harman 1984).

Agriculture and cattle farming are traditional economic activities of the Tswana people. The various duties are divided amongst the members of the family, according to their age and sex. The wife cultivates the land and the husband takes responsibility for the cattle farming. The male children assist in taking care of the livestock. Young boys begin by caring for the lambs and then move on to look after the sheep, goats and calves. The older boys look after the cattle at the cattle posts (Harman 1984).

The Tswana have a large number of tribes. The members of these tribes live in towns and villages within their tribal area. The head of the tribe is the tribal chief (*kgosi*) whose position is hereditary. The eldest son of his head wife succeeds him when he dies. The *kgosi* is very powerful and controls the economic activities of his tribe. He allots land for residential and agricultural purposes to the members of the tribe and receives part of the yield of the land and some cattle as taxes. He also administers justice and is a religious leader to his people (Harman 1984).

Private and tribal councils assist the tribal chief in his decision-making. Tribal towns are divided into wards, which are under the control of a hereditary head (*kgosana*). A council that comprises the heads of the family groups within that ward assists the kgosana in his duties. Together, all the *kgosana*s form the tribal council that advises the tribal chief. Tribal meetings are held to discuss matters that are of importance to the general public. All adult male members of the tribe have access to these meetings (Harman 1984).

Contact with the western way of life has brought about many social, economic and political changes for the Tswana, particularly in the urban areas (Harman 1984).

2.3.3 Deficiencies of current routes of supply for subsistence and emerging farmers

Subsistence and emerging commercial farmers in the developing communities of South Africa often do not have access to private veterinary services due to the high cost or inaccessibility of these services (McCrindle 1998). In the past, veterinary medicinal products were made available to these farmers through the State Veterinary Services from the government stores. Recent financial considerations have made it more difficult for the State Veterinarian to fulfill the role of veterinary medicine supplier (Stewart 1997).

As it becomes more difficult for the State Veterinary Services to supply veterinary medicinal products to livestock owners, subsistence and emerging farmers are faced with the following problems:

- Farmers' co-operatives are too far away and transport is not adequate (McCrindle 1998, Dreyer, Fourie and Kok 1999),
- Dispensing volumes are too large (McCrindle 1996),
- Products are too expensive (McCrindle 1998),
- There is a general lack of knowledge on animal disease control (McCrindle 1996), and
- Farmers do not have facilities to apply medicines safely and effectively (Dreyer, Fourie and Kok 1999).

Current legislation stipulates that:

- Drugs may not be pre-packaged for sale in volumes other than those supplied by the manufacturers; unless this is done for a particular patient by a veterinarian or pharmacist (Act 36/47 and Act 101/65), and

- Veterinary nurses and other paraveterinary professionals may only use and sell Veterinary Medicines up to and including Schedule 4 substances on the instructions (oral or written) of a veterinarian for a particular patient.

It has been recognised that a system of primary animal health care should be established in rural communities. This system will make information and preventive services readily available to the community. An upward referral system would make specialised veterinary skills and services available to the community while not over-burdening personnel with routine tasks that could be handled lower in the skills pyramid (Hohn and Williams 1997). Current legislation may be restrictive in this proposed system.

2.3.4 Routes of supply in other developing countries

In many developing countries semi-trained personnel are used to improve the delivery of veterinary services to farmers. These may be paraveterinary professionals or even livestock farmers who are appointed by their community and receive basic training. Examples of these systems include the Community-Based Animal Health system in East Africa and the Basic Animal Health Scheme in northern Malawi (Catley and Leyland 2001, Hűttner, Leidl, Jere and Pfeiffer 2000, De Haan and Bekure 1991).

The Basic Animal Health Scheme in Malawi is supported by governmental services and funded by a non-governmental organization. However, services are rendered on a cost-recovery basis in the form of a revolving fund (Hűttner, Leidl, Jere and Pfeiffer 2000). The farmers' association, Foundation for the Improvement of Animal Health, was established to administer the drug revolving fund, which made it possible to supply veterinary medicinal products to farmers through village-keymen, who were nominated by the farming

community themselves.

In Ethiopia, northern Kenya and southern Sudan, primary veterinary services have been supplied to remote and marginalized pastoralist areas through community-based animal health workers (CAHWs) (Catley and Leyland 2001). The livestock owners select these CAHWs, who then receive training and are given basic equipment and a drug kit to enable them to deliver essential services. Private veterinarians provide technical support. CAHWs sell veterinary medicinal products such as anthelmintics, acaricides, antibiotics, trypanocides and heat-stable vaccines to the livestock owners. There is full cost-recovery for the veterinary medicinal products and CAHWs also receive an incentive, which is dependent on the sales of these products.

2.4 APPROPRIATE RESEARCH METHOD TO GATHER INFORMATION ABOUT THE SUPPLY OF VETERINARY DRUGS TO SUBSISTENCE AND EMERGING FARMERS

2.4.1 Interviews and Questionnaires

Interviews and questionnaires are methods of obtaining information directly from participants by asking them to answer questions. Generally, one can distinguish between the following types of interviews and/or questionnaries (Bless and Higson-Smith 1995):

- Non-scheduled, unstructured interviews, in which participants are asked to comment on widely defined issues and are allowed to expand on topics as they see fit, to focus on particular aspects and to relate their own experiences. The interviewer is mainly present to record the information and to direct the flow of ideas. This type of interview is regarded as the most appropriate method for

exploratory research where the research questions cannot be narrowly defined.

- Non-scheduled, structured interviews, in which a list of issues that have to be investigated is made prior to the interview, but the interviewer is free to formulate other questions as judged appropriate for the given situation. This type of interview presupposes some prior information and an understanding of the problem under investigation and is regarded as useful in pilot surveys.
- Scheduled, structured interviews are based on an established questionnaire, which is presented to each respondent in exactly the same way.
- Focus groups, in which several people are interviewed together and the researcher acts as a facilitator of group discussion.
- Self-administered questionnaires, in which there is no personal contact with respondents.

Group interviews have several advantages (Bless and Higson-Smith 1995, Maundu 1995). First, the rate of information generation is higher and resources are used more economically. Second, as a rule, the information is more correct, as it is discussed and debated in the group. Since members of the group need to reach a consensus about the topic being discussed, individual views are weighed against other opinions and in this way a more balanced answer can be obtained. The disadvantage of interviewing people as a group is that certain individuals could dominate the discussion, while others who do not feel as free to share their views owing to their age, sex or social standing, withhold their opinions. Group interviews are generally inappropriate for gathering information requiring statistical treatment.

2.4.2 Rapid Rural Appraisal

A number of Veterinary Needs Appraisals have been done in communities of subsistence and emerging farmers (Dreyer , Fourie , Kok 1999; McCrindle 1996; McCrindle 1998; McCrindle 1999; Stewart 1997). These studies did not specifically look at the supply of veterinary drugs to these communities. They did, however, indicate that there was a need for improved supply.

Rapid Rural Appraisal (RRA) can be defined as a family of methods and approaches used to gain preliminary information and understanding of a rural situation in a cost-effective and timely manner (Beebe 1995 and Chambers 1992). Specific research techniques can be chosen and adapted from a wide range of options to suite the particular circumstances and topic under investigation (Beebe 1995). A multidisciplinary team, rather than an individual, conducts the research, bringing with it a variety of different perspectives and skills (Beebe 1995). The method was accepted in the 1980's as a valid approach to conducting exploratory research and has since then gained increasing levels of acceptance (Chambers 1992). When conducted properly, RRA can generate a wide range and high quality of information and insights that are inaccessible through more traditional methods (Chambers 1992).

RRA is based on the following three basic concepts (Beebe 1995):

1. *All the relevant parts of a local system cannot be identified in advance.* This means that methodologies that adhere strictly to questions that have been prepared in advance are inappropriate (e.g. the questionnaire survey). These approaches have the danger that

important elements of the local system may be missed. Semi-structured and group interviews with short guidelines as an aid to memory are therefore preferred.

2. *Triangulation.* To gain a better understanding of the local system, one should combine the expertise of a multidisciplinary team that includes locals and gather information by a range of different techniques. These techniques include information gathered in advance, direct observation and semi-structured interviews.

3. *Iteration.* The research process is an open system. Feedback is used to adapt methodologies and discover new lines of inquiry, as more is learnt about the local system.

Very little is known about the adequacy of the current routes of supply of veterinary medicinal products to developing and emerging farmers in South Africa. Rapid Rural Appraisal may be a useful research tool to investigate this matter and gather information, which would aid policy-makers in making informed decisions about the legislation and control of veterinary drug supply.

CHAPTER THREE

MATERIALS AND METHODS

3.1 STUDY AREA

The study was undertaken in the Madikwe State Veterinary District of the North West Province (Figure 2.2). This district was chosen because it exemplified many of the features typical of an emerging farming community in South Africa (*viz.* situated in the former homeland Bophuthatswana, majority communal farmers, high unemployment rates and high level of illiteracy). Furthermore, the employees of Veterinary and Field Services of the Department of Agriculture, North West Province, offered logistical support.

3.2 STUDY POPULATION

3.2.1 Target groups

The study targeted inhabitants of the Madikwe District involved in livestock production. The study population consisted of the following groups:

- Livestock Farmers (n=180)
- State Veterinarian (n=1)
- Animal Health Technicians (n=8)
- Extension Officers (n=12)
- Administration Clerks (n=5)

3.2.2 Sampling

No sampling was needed for the veterinarian, Animal Health Technicians, Extension Officers and Administration Clerks because the groups were small enough for all individuals could be interviewed or asked to fill in a questionnaire.

Meetings were held with farmers at various locations throughout the Madikwe district (Tables 4.2 and 4.3). Convenience sampling (i.e. respondents were selected from the population based on easy availability and accessibility) was applied owing to the poor demographical data available for the area and the lack of infrastructure.

3.3 METHOD OF DATA COLLECTION

Prior to commencing the study, meetings were held with the State Veterinarian and the District Manager of the Directorate of Field Services. They both supported the research project and offered their assistance. It was decided that Animal Health Technicians and Extension Officers would form part of the research team.

A combination of focus groups, questionnaires and direct observation was used to collect data.

3.3.1 Interviews

Animal Health Technicians and Extension Officers were asked to organise community meetings with livestock farmers from the area in which they worked. The meetings were held in the tribal offices of the larger villages and transport was provided for people who lived in the smaller surrounding villages. At least two weeks' notice was given for each

meeting. Permission was asked from the tribal authorities and most meetings were attended by at least one tribal leader.

The focus group method (Bless and Higson-Smith 1995) was used to interview the livestock farmers attending these meetings. Interviews were based on a questionnaire outline (Table 3.1), but farmers were given the opportunity to describe the situation freely and express their own views. The researcher also formulated or adapted questions as judged appropriate for the given situation.

Table 3.1: Questionnaire outline used during non-scheduled, structured interviews to determine the adequacy of outlets for veterinary medicinal products and the knowledge of farmers in handling these products.

Category of information	Type of information
Adequacy of outlets	1. Description and type 2. Location 3. Accessibility 4. Reliability 5. Quality assurance 6. Information supplied 7. Knowledge of staff/supplier
Knowledge of handling veterinary medicinal products by farmer	1. Transport 2. Storage
Knowledge of use of veterinary medicinal products by farmer	1. Ability to administer products 2. Perceptions of common diseases in area and ability to recognise these 3. Types of products purchased 4. Access to veterinary and paraveterinary services 5. Training opportunities available regarding animal husbandry and health 6. Alternative sources of information regarding animal husbandry and health

In each case the Extension Officer or Animal Health Technician who had organised the meeting acted as interpreter. The structure of the meeting was kept as informal as possible so that matters arising could be discussed and questions answered (Figure 3.1). The

researcher facilitated the interview in such a way as to prevent individuals from dominating the discussion.

Figure 3.1: Focus group with livestock farmers

Responses were recorded on a questionnaire proforma and notes were transferred into a field notebook at the end of each day.

A poster showing the different routes of administration of veterinary medicinal products was compiled and used as a tool to illicit responses or explanations about the administration

of these products. In this way, routes of administration familiar to the farmers and preferred by the farmers were determined.

A mock package insert was compiled (See Appendix 1) and this package insert and the current package insert for Terramycin® (Pfizer Laboratories) were shown to farmers at the meetings. The farmers were asked to discuss the two package inserts, to indicate their preferences and to make suggestions on how to improve the format further. Terramycin® was chosen because it is a product that many of the farmers use and the package insert is available in English, Afrikaans and a number of other official South African languages.

Wherever an opportunity arose, farmers were interviewed individually.

Personal interviews were held with the bookkeeper of Agriserve, the State Veterinarian and the district manager of the Directorate of Field Services.

3.3.2 Visits to outlets

All outlets for veterinary medicinal products within the Madikwe District as well as the outlets in the towns of Zeerust, Swartruggens and Skuinsdrif were visited. Each outlet was evaluated according to a set of criteria (Appendix 2). The person responsible for the sale of the products to the farmer was interviewed whenever possible.

The records of sales of veterinary medicinal products for 1999 at all the outlets in the Madikwe district managed by Agriserve, were examined to determine the types and quantities of products sold.

3.3.3 Questionnaires

All Animal Health Technicians and Extension Officers were asked to complete a questionnaire (Appendix 3).

3.3.4 Method of data analysis

Descriptive statistical analysis was mainly applied to the data. Certain questions in the questionnaires asked respondents to indicate 'always', 'sometimes' and 'never'. For these questions, the values 3, 2 and 1 were assigned to each of these terms respectively and the total score for each subdivision of the question was calculated as the sum of all the respondents' scores.

In addition, the Spatial Analyst extension of the Geographical Information Systems software package ArcView® GIS Version 3.2 for Windows® (Copyright © 1992-1999 Enivironmental Systems Research Institute Inc.) was used to perform proximity analysis for each outlet within the Madikwe district. The map of the district was divided into cells and each cell was assigned to the nearest outlet. Data collected in the different villages could therefore be assigned to the relevant outlet.

3.4 QUESTIONNAIRES TO PHARMACEUTICAL COMPANIES

3.4.1 Study Population

All registration holders/ distributors of veterinary medicinal products in the directory of the Inventory of Veterinary Specialities (IVS) Desk Reference were contacted (n = 15).

3.4.2 Method of data collection

A questionnaire (Appendix 4) was sent to pharmaceutical companies.

Questions were formulated to gather data about the following:

- Strategies used by companies to market and sell products to emerging farmers
- Success of these strategies in increasing sales and profits in this market
- Routes of supply of veterinary medicinal products to emerging farmers
- Challenges facing companies that wish to market and sell their products to emerging farmers

3.4.3 Method of data analysis

Descriptive statistical analysis was applied to the data.

CHAPTER FOUR

RESULTS

4.1 INITIAL INTERVIEWS

An overview of how veterinary services and medicinal products were supplied to the farmers of the Madikwe District was obtained from interviews with the State Veterinarian, the District Manager of the Directorate of Field Services and the bookkeeper of Agriserve.

4.1.1 Supply of veterinary and extension services to the farmers

The Department of Agriculture of the North West Province provided farmers of the Madikwe District with veterinary and extension services. The employees of the Directorate of Veterinary Services were responsible for the veterinary services and the employees of the Directorate of Field Services were responsible for the extension services. One State Veterinarian, one Chief Animal Health Technician, seven Animal Health Technicians (AHTs), twelve Extension Officers (EOs) and seven Administration Clerks served the district. The State Veterinarian and AHTs were employees of the Directorate of Veterinary Services, whereas the Directorate of Field Services employed the EOs and Administration Clerks. The employees of the Directorate of Field Services were responsible for the extension of agricultural information to the farmers of the district but were not directly involved in the provision of animal health services. The organisational structure of the veterinary and extension services available in the Madikwe district is illustrated in Figure 4.1.

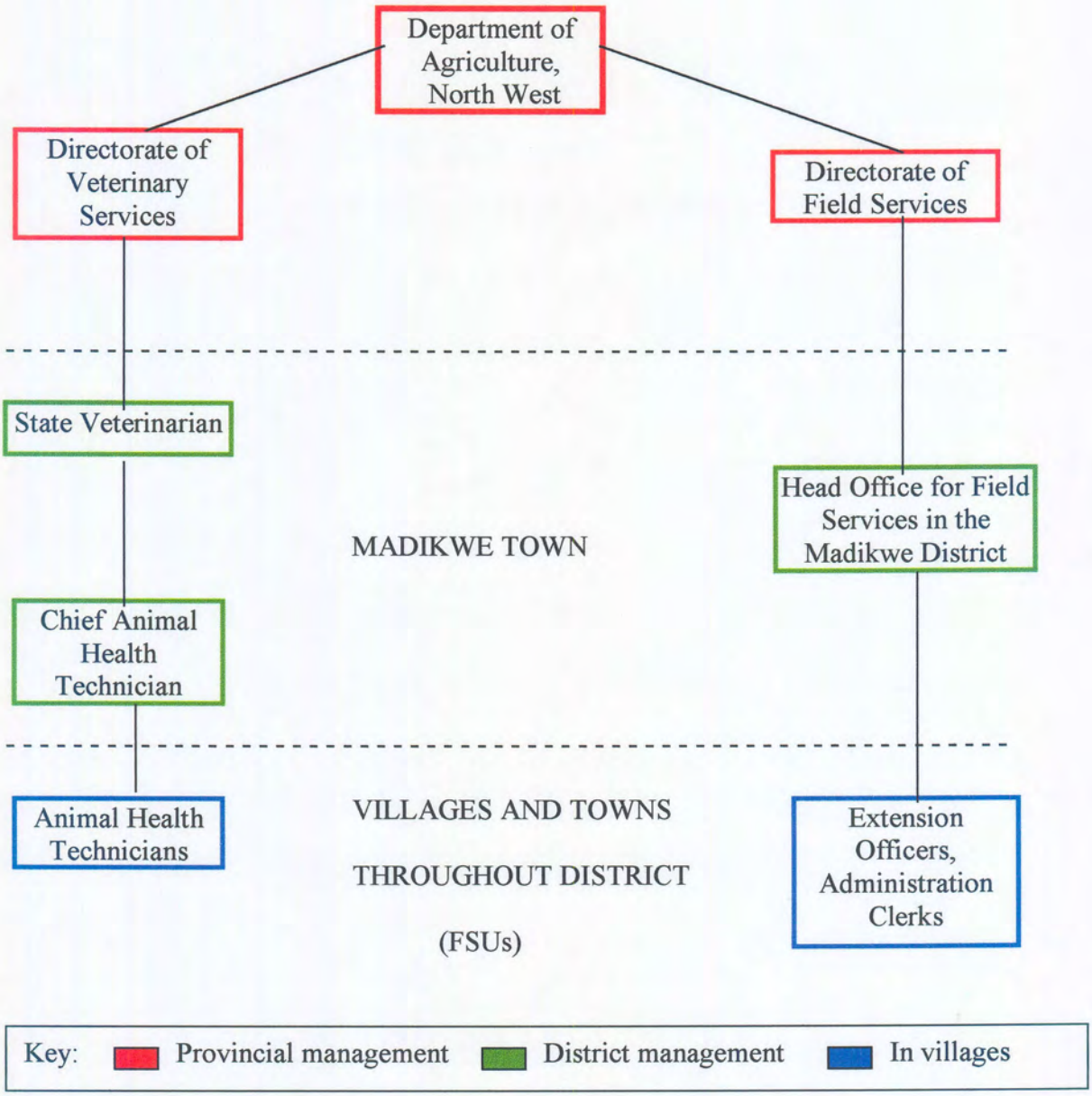


Figure 4.1: Organisational structure of veterinary and extension services available to farmers of the Madikwe district

Infrastructure included one veterinary clinic in Madikwe Town, the district head office of the Directorate of Field Services, also in Madikwe Town, and seven Frontline Service Units (FSUs) in the villages of Pella, Silwerkrans, Mabaalstad, Brakkuil, Manamela, Pitsedisule jang and Obakeng (Figures 4.2 and 4.3). These FSUs consisted of an office as well as accommodation for an AHT, EO and Administration Clerk. Some units also had handling facilities for livestock.

Figure 4.2: Frontline Service Unit with office and accommodation

The State Veterinarian was based at a veterinary clinic in Madikwe Town. He was responsible for the control of notifiable and controlled animal diseases in the district and also attended to individual clinical cases. A regular clinic was held once a week at Pella. All other clinical cases had to be reported to the offices in Madikwe Town and were attended to by the State Veterinarian at those sites. The State Veterinarian would travel to a site within 10 km of Madikwe Town free of charge. Thereafter, the farmers were charged R1,30 per kilometre. The State Veterinarian assisted with the diagnosis of the disease conditions and advised farmers on the necessary treatment, but he was unable to supply any veterinary medicinal products owing to budget constraints. Farmers were therefore responsible for the cost of all treatments. Once the diagnosis had been made, farmers would have to travel to an outlet to buy the necessary medicinal products.

Each AHT was based at a different FSU in the Madikwe District. All of them were graduates of a three-year animal health diploma and their duties included the vaccination of animals against state controlled animal diseases, extension on animal health and providing advice to farmers. They were also equipped to provide basic veterinary services (e.g. to assist with calvings and castrations) but they did not carry any veterinary medicinal products. Five of the seven AHTs had vehicles, which enabled them to perform their duties independently. The remaining two AHTs did not have their own vehicles and were dependent on their other five colleagues to help them with performing their duties.

Extension Officers were responsible for extending information about animal husbandry to the farmers and did not play any direct role in the provision of animal health care. They were also based at the FSUs. It was indicated at the interviews that there was poor

communication and co-operation between the employees of the Directorate of Veterinary Services and the Directorate of Field Services.

Before Bophuthatswana became part of South Africa, Animal Health Technicians, Extension Officers and Administration Clerks were all employees of the parastatal organization, Agricor. Agricor built and managed FSUs throughout the ex-Bophuthatswana. Drug distribution points were set up at certain FSUs to sell stock remedies.

When Bophuthatswana became part of South Africa, Agriserve, a parastatal organization affiliated to the Directorate of Field Services, succeeded Agricor. The drug distribution points were privatised where individuals in the communities were interested in taking over that business. In the Madikwe district there were no applicants interested in the business and Agriserve continued to maintain these drug distribution points.

4.1.2 Outlets for veterinary medicinal products within the Madikwe District

Agriserve continued to manage a system of stock remedy outlets at some of the FSUs in the Madikwe district. These outlets were located at Pella, Brakkuil, Obakeng, Manamela and Pitsedisule jang (Figure 4.3).

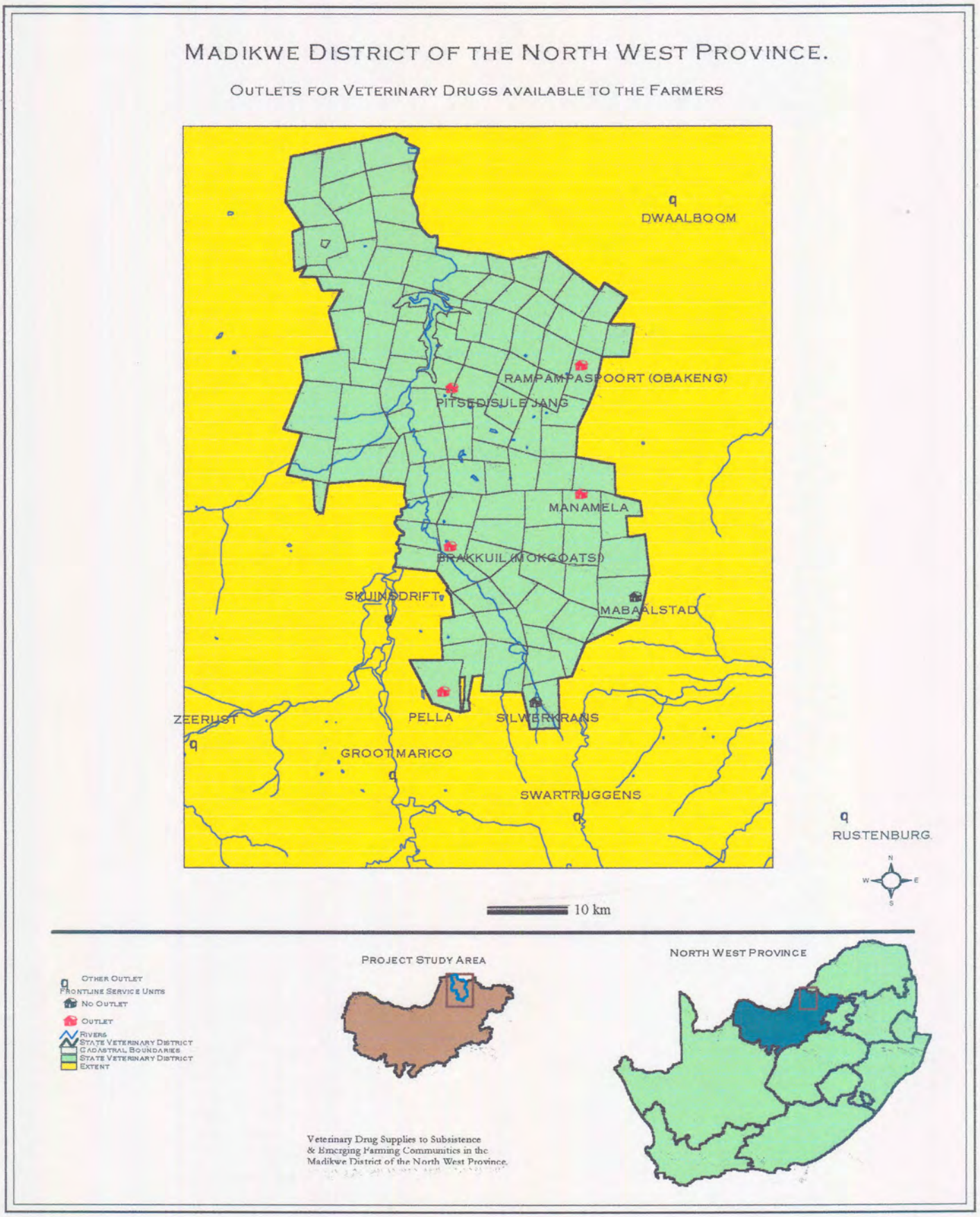


Figure 4.3: **Outlets for Veterinary Medicinal Products in the Madikwe District**

A bookkeeper, employed by Agriserve and affiliated to the Directorate of Field Services, was responsible for the procurement of stock remedies and the distribution of these products to the various FSUs. The bookkeeper was also responsible for the financial management of the outlets.

Most of the products sold to the farmers at the FSUs were bought by the bookkeeper from the farmers' co-operative in Zeerust at the full retail price. The pharmaceutical company, Pfizer Laboratories, delivered its products to the offices of Field Services at Madikwe Town and also retrieved products that were close to expiry to sell these in areas requiring larger volumes.

The bookkeeper personally delivered the requested products on a monthly basis to the FSUs by road, using an open light delivery vehicle. The products were sold to the farmers at the full retail price plus 10% to recover the transport costs.

At each of the FSUs, an Administration Clerk managed and sold the products. Stocks were replenished by placing orders to the bookkeeper at the Head Office in Madikwe Town. The range of products kept was determined according to demand by farmers in each particular area.

The bookkeeper indicated that Agriserve found it difficult to recover the costs of this service. Stocks, which had to be discarded because they expired due to poor sales as well as theft, were mentioned as reasons.

4.1.3 Other outlets for veterinary medicinal products

Farmers also had the option of buying veterinary medicinal products from the farmers' co-operatives and pharmacies in the larger towns of Swartruggens, Groot Marico, Zeerust and Rustenburg. There were also farmers' co-operatives in the smaller towns of Skuinsdrif and Dwaalboom (Figure 4.3).

4.2 INTERVIEWS WITH THE LIVESTOCK FARMERS

4.2.1 Summary of respondents

The farmers were interviewed on a total of fifteen (15) occasions. Eleven of these were community meetings and four were individual interviews. The location of these meetings and the number of attendees are summarised in Tables 4.1 and 4.2.

Table 4.1: Summary of location of community meetings and number of attendees

Location of the meeting	Number of attendees	Male	Female
Lethlakaneng	24	20	4
Mmatau	14	14	0
Brakkuil	6	6	0
Sesobe	27	26	1
Madikwe Town	7	6	1
Pella	4	4	0
Manamela	19	19	0
Khayakhulu	21	19	2
Vrede II	5	5	0
Obakeng	15	14	1
Pitsedisule jang	36	29	7
TOTAL	**178**	**162**	**16**

The attendees at each community meeting were communal farmers from the village at which the meeting was held or from other villages within an approximate 15 km radius.

Table 4.2: Summary of locations and circumstances of individual interviews

Location where interview was held	Town of origin of interviewee	Circumstances of interview
Madikwe Town	Silwerkrans	Interview after Farmers' Day
Madikwe Town	Pella	Interview after Farmers' Day
Madikwe Town	Own farm 20 km North of Swartruggens	Answered questions on proforma questionnaire independently
Mabaalstad	Mabaalstad	Only farmer to arrive at the community meeting arranged in Mabaalstad

One of the farmers, who was interviewed individually at Madikwe Town, was a commercial farmer with his own farm.

4.2.2 Type of outlets used by the farmers

The farmers of the Madikwe District purchased veterinary medicinal products from one or more of the following outlets:

- Closest FSU
- FSU in another village
- Farmers' co-operative in one of the larger towns
- Pharmacy in one of the larger towns

The number of occasions at which each type of outlet was mentioned is illustrated in Figure 4.4. On two occasions, farmers mentioned purchasing products directly from the State Veterinarian. Outlets were located in towns and villages in and around the Madikwe district. The number of occasions at which each town and village was mentioned is illustrated in Figure 4.5.

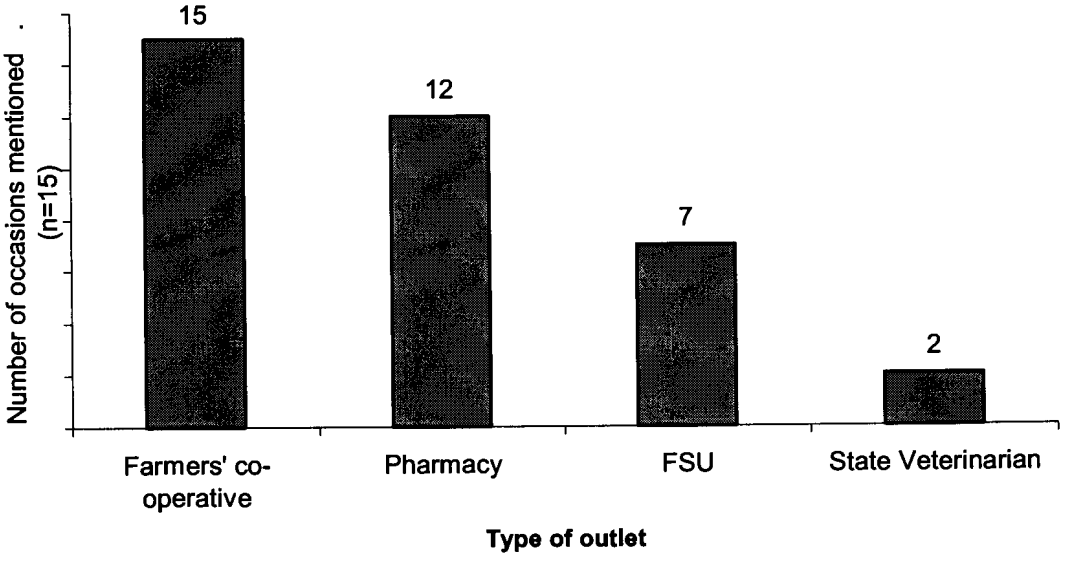


Figure 4.4: Number of occasions at which farmers mentioned purchasing veterinary medicinal products at each type of outlet (n=15)

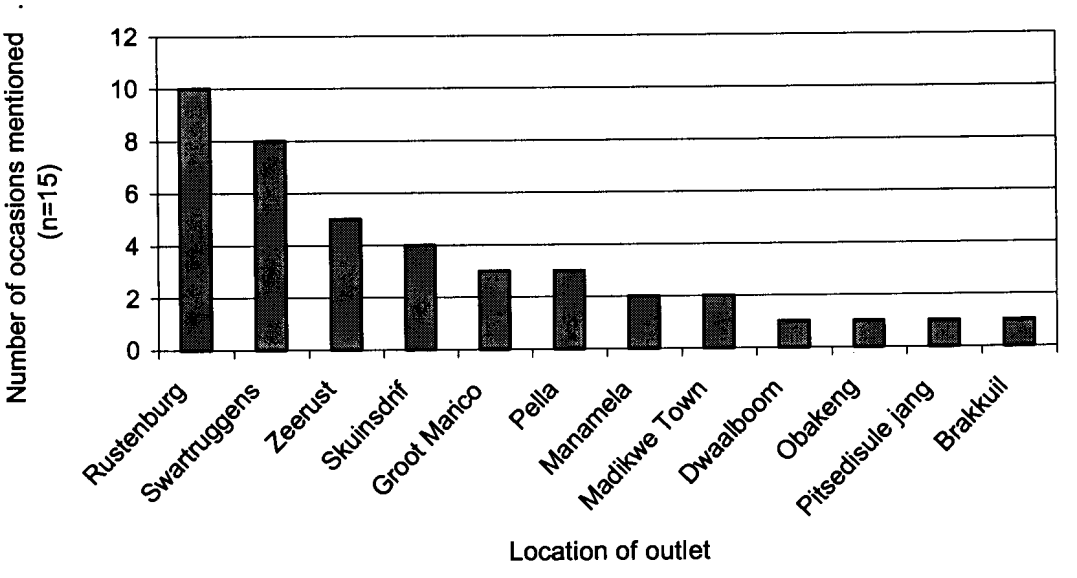


Figure 4.5: Location of the outlets mentioned by the farmers

Farmers' co-operatives were the main outlets used by farmers and were mentioned on all fifteen (15) interview occasions. This was followed by pharmacies, which were mentioned on twelve (12) of the interview occasions. Rustenburg was mentioned most frequently as the town to which farmers travelled to purchase veterinary medicinal products. Swartruggens and Zeerust were the other larger towns that were often mentioned.

Farmers indicated on thirteen (13) occasions that they were aware that stock remedies were available at selected FSUs. However, only on seven (7) occasions did they indicate that they purchased products at these outlets. Only two FSU outlets were mentioned more than once (Pella was mentioned three times and Manamela was mentioned twice).

All four farmers who were interviewed individually indicated that they bought their products from farmers' co-operatives and pharmacies in the larger towns and did not purchase any products from the FSUs.

One farmer mentioned that he acquired his veterinary medicinal products from a farmers' co-operative in Johannesburg since he frequently visited the city.

4.2.3 Accessibility of outlets to farmers

The accessibility of the outlets for veterinary medicinal products was dependent on the distance between the village in which the farmer lived and the outlet, as well as the availability and cost of transport to the outlet.

Although the five FSU outlets were scattered throughout the Madikwe district, farmers living in some of the villages did not have an FSU outlet available within walking distance. Villages that did not have an FSU outlet within 10 km were: Madikwe Town and Vrede I (15 km to the nearest outlet); Lethlakaneng, David Katnagel and Vrede II (20 km to the nearest outlet); and Molatedi (30 km to the nearest outlet). Farmers from these villages needed either their own vehicle or were dependent on public transport to get to an outlet to acquire veterinary medicinal products. The distances travelled by farmers to outlets are summarised in Table 4.3.

Table 4.3: Distances travelled by farmers to the outlets for veterinary medicinal products that they mentioned using in interviews.

Location of meeting	Mean distance travelled to outlets (km)	Range of distance travelled to outlets	Outlets used
Lethlakaneng	80	80	Rustenburg[a]
Mmatau	60	40-95	Rustenburg[a],Skuinsdrig[a],Swartruggens[a]
Brakkuil *	71	40-110	Pella,Rustenburg[a],Swartruggens[a],Zeerust[a]
Sesobe	85	40-130	Pitsedisule jang,Rustenburg[a],Skuinsdrif[a],Zeerust[a]
Madikwe Town *	60	55-70	Skuinsdrif[a],Swartruggens[a],Zeerust[a]
Pella *	37,5	25-50	Swartruggens[a]
Manamela *	95	95	Rustenburg[a]
Khayakhulu	45	10-80	Manamela,Rustenburg[a]
Vrede II	40	20-50	Pella,Skuinsdrif[a],Swartruggens[a],Zeerust[a],Groot Marico[a]
Obakeng *	83	40-125	Rustenburg[a],Dwaalboom[a]
Pitsedisule jang *	113	90-135	Rustenburg[a],Zeerust[a]
Average	**70**		

* - Also purchased products at FSUs in own village
[a] - Farmers'co-operatives and/or pharmacies

The average distance that farmers travelled to outlets, other than the closest FSU, was 70 km. Only five farmers who were interviewed indicated that they had their own transport. All the other persons interviewed were therefore dependent on public transport, which was either by bus or taxi. The average return fare to Rustenburg was R28,50 (R10 - R50). Taxis were slightly more expensive than buses.

Although transport services ran regularly, farmers felt that public transport was inconvenient. Bus transport only left once or twice a day. Taxis were more expensive and were often fully laden, particularly on return routes. Transport to the larger centres, even if these were further away, appeared to be more reliable and convenient. Many taxis asked the same fare, whether the passenger travelled the full distance or not. This made it disadvantageous for farmers to travel to other villages within the Madikwe district, even if these were closer than the larger centres.

4.2.4 Reliability and quality of outlets

The comments of the farmers about the different types of outlets are summarised in Table 4.4. The number of meetings/ interviews at which a particular comment was recorded is indicated. Positive comments are indicated as (+), and negative comments as (-). Each type of outlet has been given a total score by adding up the number of negative and positive comments. The symbol (0) indicates that no comment was made.

Table 4.4: Comments of farmers about the different outlets

Comments	Number of responses		
	FSUs	**Farmers' co-ops**	**Pharmacies**
Staff were able to give advice	+1	+2	0
Required products were always available	-15	+12	-1
None of the products sold had expired	-3	-2	0
Staff were present to help	-2	0	0
Prices were reasonable	-2	+1	-5
Was located in Central Business District of towns and easily accessible	0	0	+1
Products were sold in their original packaging and clearly labelled	0	0	-3
Total	-21	+13	-6

Some farmers mentioned that they could obtain Schedule 4 antimicrobial products (parenteral penicillins) from pharmacies without a veterinary prescription.

Farmers' co-operatives received the most positive comments, followed by pharmacies. Farmers appeared to go to pharmacies to purchase products that were not available at co-operatives due to the scheduling status of that product, although at one meeting it was mentioned that the pharmacy was more convenient because it is situated in the Central Business District.

FSU outlets received the most negative comments. The most frequently mentioned criticism of the FSU outlets was that the required products were not always available. Vaccines were specifically mentioned on three occasions. This is in contrast to the farmers' co-operatives, where farmers felt that the required products were always available.

4.2.5 Knowledge of farmers of handling veterinary medicinal products correctly

Table 4.5 summarises the answers given by farmers at the meetings to questions about how they handled and stored the products they purchased.

Table 4.5: Summary of responses indicating the level to which farmers store and handle veterinary medicinal products correctly

Requirement for correct handling and storage of veterinary drugs	Number of occasions at which farmers said they complied with the requirement (n=15)
Vaccines transported in cooler box	2
Vaccines and other thermolabile products stored in fridge	8
Veterinary medicinal products inaccessible to children and animals	13
Veterinary medicinal products away from food and other chemicals	13
Veterinary medicinal products discarded if expired	14

The farmers indicated at only one meeting that they used expired products. At this meeting one farmer mentioned that he had observed an injectable tetracycline that had turned brown. He discarded this product when it had happened.

The majority of farmers (>80%) indicated that they stored veterinary medicinal products safely, away from children and pets, food or other chemicals.

Only slightly more than half of the responses indicated that the farmers had the facilities to store thermolabile products correctly. Some farmers indicated that, as a compromise, they stored these products on the cement floors of their homes, which are quite cool. At another meeting it was said that the vaccine was used on the day of purchase and that any left-over

vaccine was discarded. One farmer said that he had been told to use a vaccine on the same day as purchasing it; otherwise it would kill the animal.

Very few farmers (13,3% of responses) transported thermolabile products in cooler boxes.

4.2.6 Ability of farmers to administer veterinary medicinal products correctly

Table 4.6 summarises the response of the farmers to the questions of who was responsible for administering veterinary medicinal products to their animals.

Table 4.6: Persons responsible for administering veterinary medicinal products.

Category of persons	Number of responses
Farmer	15
Animal Health Technician	3
State Veterinarian	3
Hired worker	1
Another farmer (friend)	1

On all occasions, the farmers indicated that they administered the veterinary medicinal products to their animals themselves. In addition, the Animal Health Technician and State Veterinarian were each mentioned on three occasions, whereas a hired worker and a friend who was also a farmer were both mentioned on one occasion.

The fact that farmers mostly administered veterinary medicinal products to their animals themselves led to the question of where they had received training or advice on the administration of these products and whether they had perceived this training/advice as being adequate.

Figure 4.6 illustrates the responses of farmers, indicating whether they had been shown how to administer stock remedies and who showed them. At some meetings different farmers gave different responses. In such cases, all responses were recorded.

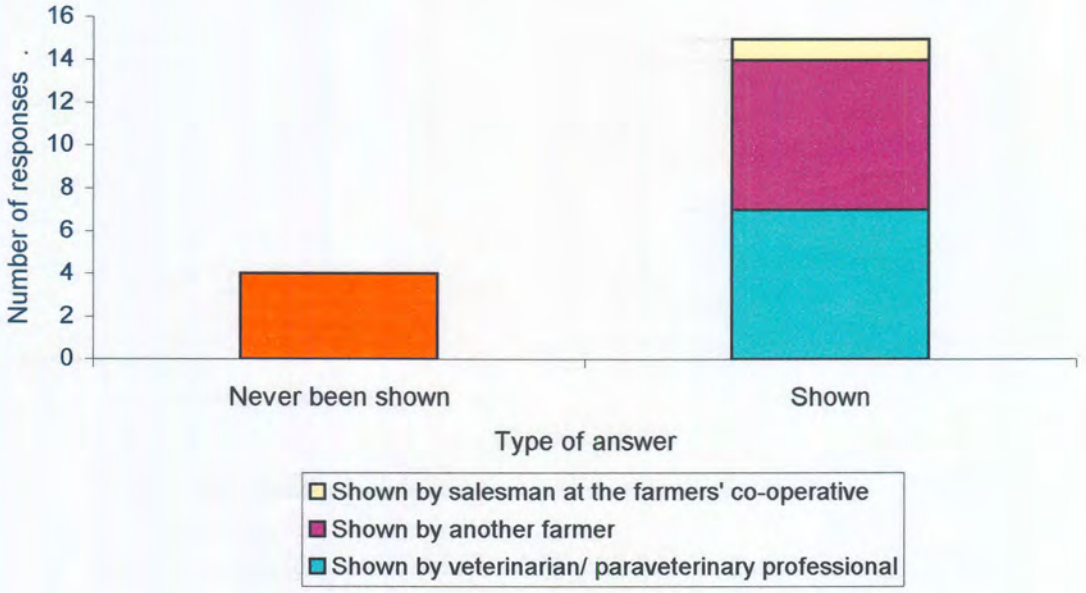


Figure 4.6: Source of demonstration of method of administration to farmers

The majority of responses (73,3%) indicated that farmers had indeed been shown how to administer veterinary medicinal products. The number of farmers indicating that a veterinarian or paraveterinary professional had shown them and those that had been shown by other farmers was the same. At one meeting there was a complaint that the Animal Health Technicians did not take the time to show farmers how to administer a veterinary medicinal product by subcutaneous injection when they came to vaccinate animals. Also, it was said that the Animal Health Technicians took too long to respond if a farmer requested help with administering products to their animals.

Figure 4.7 illustrates which of the routes of administration that were illustrated on a poster shown to the farmers, were familiar and convenient to them.

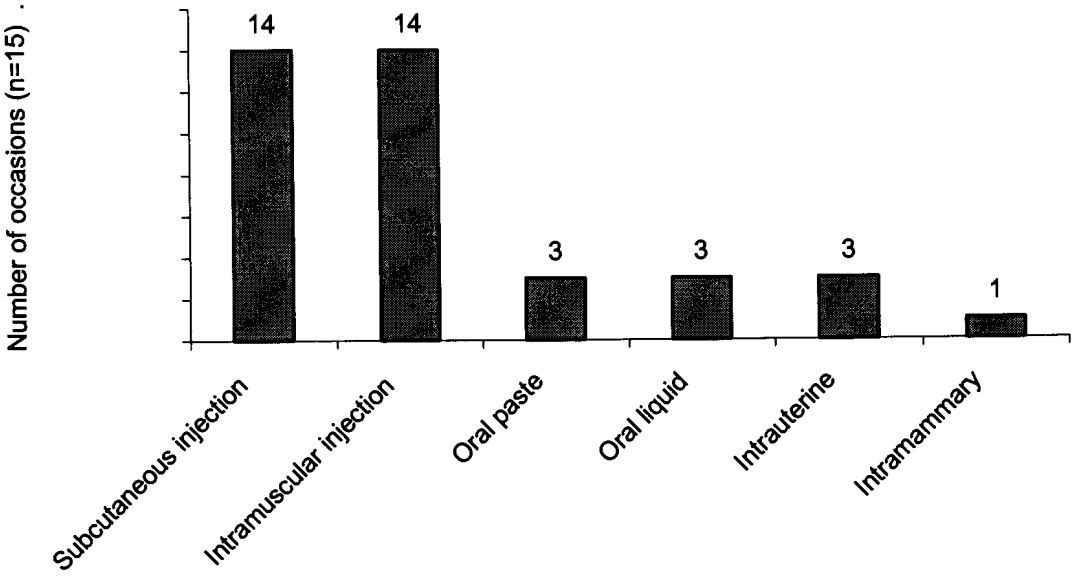


Figure 4.7: Number of occasions at which farmers mentioned that a particular route of administration was familiar and convenient to them

Farmers were most familiar with subcutaneous and intramuscular injections. However, on two occasions it was noticed that the farmers had a poor understanding of the difference between intramuscular and subcutaneous injections.

At all the meetings, farmers said that they bought hypodermic needles and syringes at the farmers' co-operative, which they re-used several times. On eight occasions, the farmers were asked how they cared for these syringes and the responses are summarised in Table 4.7.

Table 4.7: Methods of cleaning hypodermic needles and syringes by farmers

Method of cleaning	Number of occasions mentioned (n=8)
Syringes and needles are boiled in water after each use	3
Syringes and needles are washed in warm water after each use	2
Syringes and needles are washed in cold water after each use	1
Syringes are flushed with warm water and the needles are boiled in water after each use	1
Syringes and needles are boiled in water after a day's use	1

The farmers appeared to be less familiar with the oral route of administration; however, some farmers did have equipment to administer products using this route. Some farmers had their own dosing guns (mentioned on three occasions) or access to a communal dosing gun (mentioned on one occasion). Other methods mentioned were the use of plastic syringes (mentioned on one occasion) and a 1-litre glass cold-drink bottle (mentioned on three occasions).

Opinions were varied about the convenience of orally administered products. Some farmers indicated that they would like more products that could be administered by the oral route (two occasions) and others indicated that formulations that could be administered in the feed or as licks would be useful (four occasions). However, at three other meetings farmers

responded that they had found the oral route inconvenient and that it was difficult to ensure that the animal retained the whole dose given.

Most farmers appeared to be unaware of intramammary preparations, which could be used to treat mastitis. This seemed to be due to a lack of information about these formulations.

At 10 of the interviews the methods of applying ectoparasiticides were discussed. The three different methods of applying ectoparasiticides that were mentioned were spraying (n=6), greases (n=2) and pour-ons (n=2).

Crushes, which made it easier for the farmers to spray their animals with ectoparasiticides, were available to all the farmers who were interviewed. However, the farmers interviewed at Manamela and Khayakhulu complained that the crush available to them needed repair.

The reasons offered by farmers for preferring sprays to pour-ons were that pour-ons were more expensive, took longer to work and made the meat unfit for human consumption if the animal should die soon after administration.

On six (6) occasions, farmers described specific ways in which they treated certain conditions or administered veterinary medicinal products. These comments are summarised in Table 4.8.

Table 4.8: Specific treatments and treatment procedures mentioned by farmers

Methods described	Number of occasions at which mentioned (n=6)
Dips mixed with old motor oil to make it last longer	5
Mix Carbadust® with motor oil and apply as grease under the tail and between the hooves of sheep	1
Buy smaller volumes of dip to save money and make it last by decreasing the dose per animal	1
Do not calculate exact doses but administer approximate doses according to the age of the animal e.g. 10 ml Terramycin® for a heifer	1
Administer a dose of approximately 5 ml Terramycin® per adult bovine for the treatment of Heartwater	1
Use the oral Terramycin Animal Formula Soluble Powder® reconstituted with tap water as an injectable formulation because it did not expire as quickly as the injectable formulations.	1
Use of diesel to treat wounds and abscesses that had burst	2
Use diesel/ petrol to treat eye problems	1
Treat abscesses with hot/cold therapy to encourage ripening	1
Use water and Dettol® to clean wounds*	1
Use brown sugar, vinegar and water as a rumenotorics*	1
Boil water, allow it to cool and pump it into the uterus to treat retained placenta*	1

*The last three methods were all mentioned at one meeting held in Vrede II.

On the occasions at which the use of diesel to treat wounds and eye problems were described, farmers mentioned that these were only used as alternatives if they could not afford conventional treatments. On four occasions, farmers admitted that they had difficulty in estimating the weight of their animals accurately.

Farmers mentioned the occurrence of abscesses at injections sites on four occasions. Aspiration pneumonia after dipping in dip tanks was mentioned on one occasion. This was probably not mentioned more often because the dip tanks are no longer used in the Madikwe District.

The burning of animals' skins after the administration of dips mixed with motor oil was mentioned twice. At one of the meetings, the farmers indicated that they did not perceive the burning of the skin to be a problem, because they merely reduced the amount of dip in the formulation the next time, which prevented further injury to the animals.

Resistance of ticks to the dips used was mentioned as a problem on one occasion.

On three separate occasions, farmers mentioned that animals had died after veterinary medicinal products had been administered. The farmers attributed these deaths to the products. The situations mentioned were: sudden death 4-5 hours after administering various different products, a kid that died within an hour after the administration of 'gall powder' and animals that died after the administration of Terramycin LA®. The time between oxytetracycline administration and death varied from a few hours to a few days. The correlation between the administration of the veterinary medicinal products and the death of the animals is difficult to ascertain. Deaths may also have been due to the progression of the disease or totally unrelated causes.

A single incident was mentioned when a number of animals had died after being vaccinated by an Animal Health Technician. On a separate occasion, farmers mentioned that an animal had died after being treated for lameness by a veterinarian. It was also mentioned on several occasions that dogs died after rabies vaccinations.

4.2.7 Diseases perceived by the farmers as being of importance

Farmers specifically mentioned a number of diseases, which they considered to be important constraints to livestock production in the Madikwe district. These diseases were anaplasmosis, heartwater, redwater, botulism, 3-day stiffsickness, blackquarter, lumpy skin disease, mastitis, brucellosis, parafilariasis, sweating sickness in calves, corynebacterial abscesses, Newcastle's disease in chickens, infectious coryza in chickens, pasteurellosis in small stock, internal parasites in small stock, footrot and warts.

A commonly-mentioned ailment was 'gala'. It is uncertain whether this term was used to describe the disease anaplasmosis (also called gallsickness due to the icterus that characterizes this disease) or whether it was used as a general term to describe an ill animal.

Farmers described the symptoms of anaplasmosis as weakness, a dry nose and a yellow carcass at post-mortem. The symptoms of dry nose, goose-stepping gait, circling, animals lying on their sides and kicking and fluid around the heart and in the thoracic cavity on post-mortem were associated with heartwater.

The symptoms of listlessness, drooping ears and decreased activity and grazing were mentioned as being indicative of a sick animal.

Some farmers were unable to name specific diseases but mentioned a number of clinical symptoms. These symptoms were general stiffness in cattle, shoulder stiffness in cattle, stiffness in the neck of chickens, nasal discharge in sheep, hard nodules in the skin, sudden death in cattle and kids and swollen liver at post-mortem in cattle.

The disease syndromes mentioned were udder abscessation, abortions, dystocia, retained placenta, preputial prolapse, external abscesses, internal abscesses, diarrhoea in calves, diarrhoea in goats, poor weight-gain in calves and eye infections.

Unfortunately, the true incidence of livestock diseases could not be determined owing to poor records. Very few reported cases for the Madikwe District appeared in the Annual Report of the Directorate of Veterinary Services for 1998. The cost of calling out the State Veterinarian and the lack of regular clinics throughout the district are likely reasons for this. Cases of Heartwater in cattle were reported at Pella, where a clinic was available on a regular basis. Outbreaks of Newcastle Disease in poultry and brucellosis in cattle were also reported to have occurred during 1998.

Bovine babesiosis, Heartwater in cattle, sheep and goats as well as anaplasmosis in cattle and Lumpy Skin Disease in cattle were all reported in neighbouring districts during 1998. These diseases are therefore also likely to occur in the Madikwe district to a certain extent. Miscellaneous diseases such as abscesses, conjunctivitis, pneumonia and mastitis were also reported to have occurred throughout the North West Province. Parafilariasis was reported in the Eastern region, which borders on the Madikwe District.

The employees of the Directorate of Veterinary Services vaccinated animals against controlled animal diseases (bovine brucellosis, rabies, anthrax and Newcastle Disease). In 1998, 1 967 cattle were vaccinated against brucellosis, 669 animals were vaccinated against rabies, 29 770 cattle were vaccinated against anthrax and 600 chickens were vaccinated against Newcastle Disease.

Vaccinations against Pasteurellosis, Pulpy Kidney, Black Quarter and *Actinobacillus pyogenes* were reported to have been done in the North West Province, including the Central region, which includes the Madikwe District.

4.2.8 Types of products purchased by the farmers

The veterinary medicinal products, purchased by farmers as mentioned in the interviews, are summarised in Table 4.9.

Parenteral tetracycline preparations were mentioned on all occasions, whereas ectoparasiticides were only mentioned at thirteen of the fifteen interviews.

Table 4.9: Veterinary medicinal products purchased by farmers

Veterinary medicinal product	Number of occasions on which mentioned (n=15)
Parenteral Tetracyclines (Terramycin®, Terramycin LA®, Curamycin®, Obermycin®, HI-TET®, Swamycin®, Dactomycin®, Reverin®)	15
Ectoparasiticides (Drastic Deadline®, Triatix®, Dectomax®, Disnis NF Dip®, Dazzel NF®)	13
Various vaccines (Blackquater, Botulism, Pulpy kidney)	9
Parenteral penicillins	3
Eye powders	3
Anthelmintics	3
Wound sprays	2
Oral Tetracyclines (Terramycin Animal Formula Soluble Powder®)	1
Antidiarrhoeals	1
Vitamin supplements (Bob Martins®)	1

The product Reverin® is a Tetracycline/antibabesial combination product that is no longer on the market. This product was mentioned by an elderly farmer.

The volumes of veterinary medicinal products that a farmer would need to purchase at one time is dependent on the number of animals owned and the incidence of the condition to be treated.

On the majority of occasions (60%), the farmers indicated that the volumes in which veterinary medicinal products were sold were appropriate. Only one farmer felt that the volumes were too small. This was the farmer who owned his own farm approximately 20 km north of Swartruggens. At five of the fifteen interviews (33%), farmers indicated that the volumes were too large

On two occasions, distinction was made between ectoparasiticides and antimicrobials. It appeared that ectoparasiticides were used in larger volumes and there was no problem to be able to use the product before the expiry date. However, antimicrobials often had to be discarded because they had expired.

At twelve out of the fifteen interviews (80%), farmers indicated that they preferred to buy products in multiple doses.

The farmers pointed out on three occasions that they had to travel far to purchase veterinary medicinal products and that this was the reason why they preferred to buy multiple dose containers. If the appropriate products were available at outlets that were closer, it would help farmers with limited funds if single doses could be purchased at a time.

4.2.9 Accessibility of veterinary and paraveterinary services to the farmers

Table 4.10 summarises who, in the farmers' opinion, was the best source of information about livestock health and veterinary medicinal products.

Table 4.10: Judged value of persons as sources of information

Type of Person	Number of responses		
	Very valuable	Some value	No value
Other farmers	9	2	4
Extension Officers	6	2	7
State Veterinarian	3	6	6
Animal Health Technician	2	7	6
Salesperson at farmers' co-operative	3	7	5
Representatives of Pharmaceutical companies	3	1	11
Traditional Healer	0	4	11

The majority of farmers regarded other farmers (some mentioned black and white farmers) as the most helpful source of information regarding animal diseases and veterinary medicinal products. The Extension Officers (EOs) were also regarded as very valuable. The reason for this may be that many of the EOs had been in service in the Madikwe District for quite some time and had built a trust relationship with the farmers, whereas the majority of the AHTs were newly appointed. Sales staff at the farmers' co-operatives, the State Veterinarian and AHTs were regarded as being moderately valuable. Sales representatives from pharmaceutical companies and traditional healers were not regarded as being of any value.

4.2.10 Training opportunities available to the farmers

The perceptions of farmers about the adequacy of the number of farmers' days and extension workshops arranged are summarised in Table 4.11. These opinions are linked to the village in which the meeting was held.

Table 4.11: Farmers' perceptions of the adequacy of the number of farmers' days and extension workshops arranged.

Interviews/ Meetings	Ample	Some	None	Comments
Madikwe Town	X			
Madikwe Town	X			
Madikwe Town	X			
Pella	X			
Madikwe Town		X		
Mabaalstad		X		Had heard of farmers' days but had not made the time to attend them
Mmatau		X		Leaders were invited to the farmers' days and then extended the message to others
Brakkuil		X		
Sesobe		X		
Manamela		X		Adequate notice should have been given - at least one week so that everyone could get to hear about the workshop/ farmers' day
Obakeng		X		Could not attend farmers' days in Madikwe because they did not have transport
Pitsedisule jang		X		Could not attend farmers' days in Madikwe because they did not have transport. News of the farmers' days does not reach the farmers.
Khayakhulu		X		
Lethlakaneng			X	
Vrede II			X	The extension officer had recently been transferred to the area and had not yet had time to organize workshops
Total	4	9	2	

On the majority of occasions (9 out of 15 interviews), farmers indicated that, although there were educational opportunities such as farmers' days and extension workshops available to them, more opportunities should be provided.

4.2.11 Alternative sources of information for the farmers

A considerable number of the farmers that were interviewed had access to radio (mentioned on 10 occasions). On two occasions farmers indicated that they had access to television. One of these was during an individual interview and the other was during a communal meeting at which only a few farmers indicated that they had access to television.

At approximately half of the interviews (46,7%), farmers said that they had access to printed material with information about animal husbandry, livestock diseases and veterinary medicinal products. More than half of these respondents (57,1%) indicated that they would like more such material to be made available. On only two occasions at which farmers indicated that they did not have access to printed information was it said that there was no need for this type of information transfer.

A need was expressed on three occasions that the material should be written in a simple, understandable form (preferably in Tswana).

On two occasions, farmers indicated that the package insert was their main source of information when using a veterinary medicinal product.

The majority of the farmers (85,7%), who were shown the different package inserts, indicated that they preferred a pictorial package insert that was accompanied by simple text. On only two occasions did farmers indicate that they preferred a package insert with text only. The reason offered for this preference was that the pictures were confusing. None of the farmers felt that the package insert that was written only in English and Afrikaans conveyed the information effectively.

Further suggestions on how package inserts could be improved were also made:

- Package inserts should give dosage guidelines according to the ages of the animals
- Pictorial package inserts should be supported by comprehensive text
- The text should be in Tswana
- Colour codes should be used to simplify dosing instructions
- All package inserts should be written according to a set format

It was mentioned on one occasion that the translation of package inserts into Tswana might be confusing for farmers because the language does not possess the necessary technical terminology.

4.3 QUESTIONNAIRES TO PARAVETERINARY PROFESSIONALS

Six of the seven Animal Health Technicians (86%) and five of the twelve Extension Officers (42%) responded to the questionnaire.

4.3.1 Type of veterinary medicinal products purchased by farmers

The Animal Health Technicians and Extension Officers scored the different types of veterinary medicinal products according to the relative quantities purchased by the farmers within the Madikwe district. These results are illustrated in Figure 4.8.

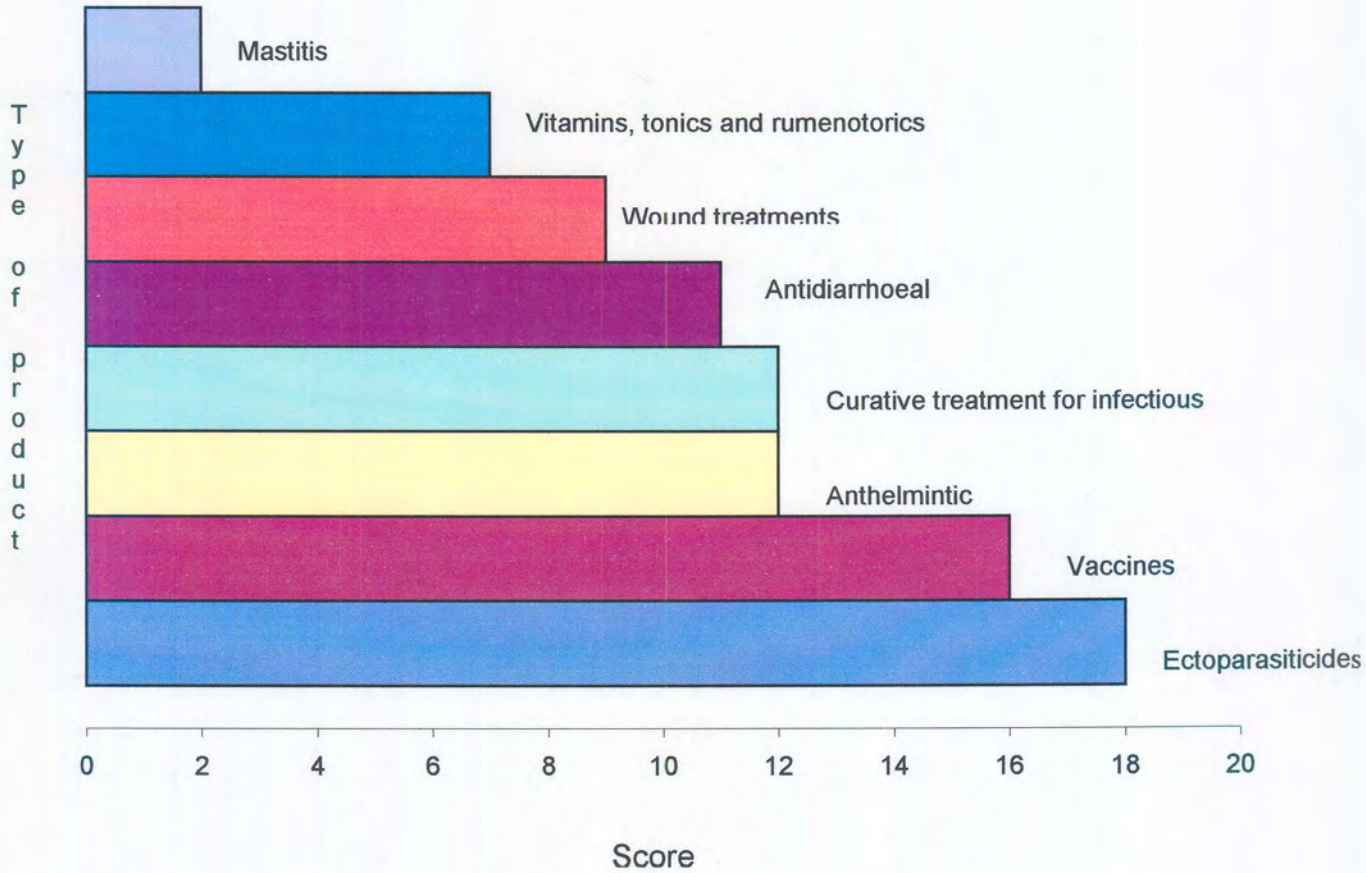


Figure 4.8: AHTs' and EOs' scores of perceived relative quantities of veterinary medicinal products purchased by farmers

The AHTs and EOs were of the opinion that the products purchased in the greatest quantities by farmers were ectoparasiticides. Vaccines and then curative treatments for infectious diseases and anthelmintics followed this. The EOs and AHTs were of the opinion that very small quantities of mastitis treatments were purchased, which was correlated with the poor awareness of these products by farmers (Figure 4.7).

Some of the AHTs and EOs mentioned that the products farmers wished to purchase were not always available at the FSUs in the Madikwe district and that farmers would therefore

often travel to the farmers' co-operatives and pharmacies in the larger towns. Other reasons given for farmers traveling to the larger town were that the staff at the FSUs were unable to give advice and were not always present to sell the products.

4.3.2 Ability of farmers to administer veterinary medicinal products correctly

The scores given by the AHTs and EOs to the different ways in which farmers misused veterinary medicinal products are summarised in Figure 4.9. The AHTs and EOs based these scores on the frequency with which they were observed.

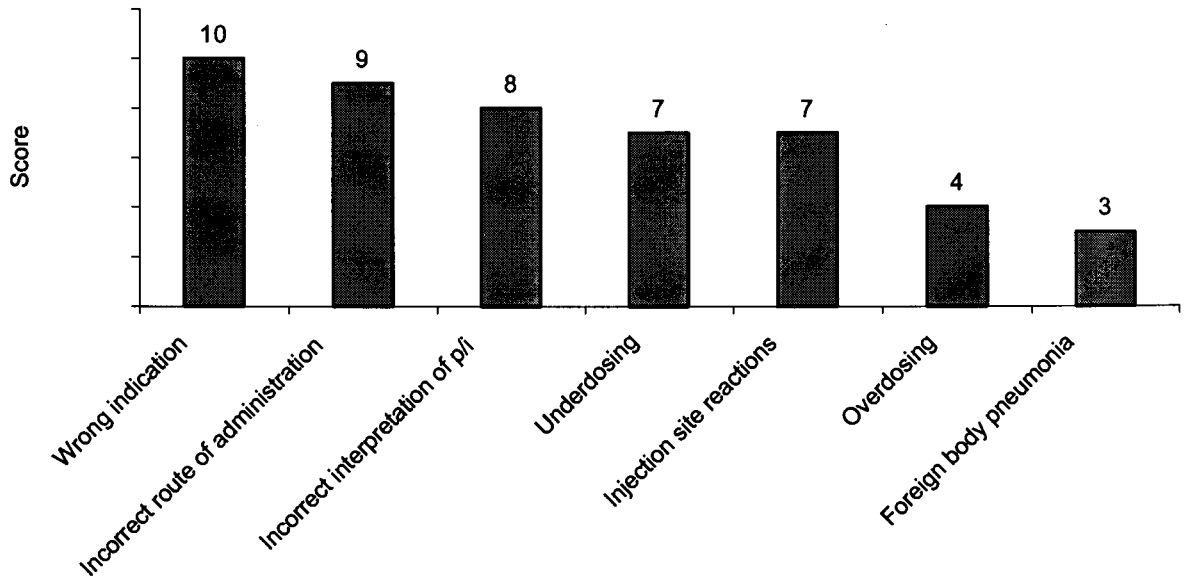


Figure 4.9: Observations of AHTs and EOs of incorrect administration of veterinary medicinal products by farmers (p/i = package insert)

Most frequently, it was observed that products were used for the wrong indication and administered by the incorrect route. Many of the AHTs and EOs observed that farmers did

not interpret the package insert correctly, thus accounting for farmers administering incorrect doses by the wrong route for the wrong indication.

One AHT said that some farmers administered small doses of parenteral oxytetracycline as a 'vaccine'. These farmers believed that this would prevent their animals from contracting diseases such as heartwater and anaplasmosis.

AHTs and EOs did not observe many cases of foreign body pneumonia.

A tendency to underdose rather than overdose animals was observed. This correlates with the smaller volumes of dips purchased by farmers to save money (Table 4.9).

4.4 EVALUATION OF OUTLETS

4.4.1 Frontline Service Units

The results of the visits to the five outlets at the FSUs in the Madikwe District are summarised in Table 4.12.

Table 4.12: Evaluation of the FSU outlets (n=5)

Inspection criteria	Number of FSUs
All remedies sold in their original packaging	5
Unregistered remedies sold	0
Scheduled remedies sold	0
Remedies stored securely away from the general public	5
Remedies effectively protected from sunlight	5
Remedies adequately labelled with relevant indications, instructions and warnings	4
Adequate records kept	4
Records kept up to date	4
Expired stock displayed for sale	1
Remedies in clean condition and labels clearly visible	3
Staff trained to advise customers	1
Remedies subdivided	1
Remedies displayed according to therapeutic groups	1
Refrigerator available to store thermolabile products	0
Poisonous substances separated from other products	0
Display clearly visible and attractive	0
Ambient temperature in display and storage areas monitored regularly and controlled	0
Adequate shelving	0

Only registered stock remedies were sold at the Frontline Service Units. All these remedies were in their original packaging and therefore adequately labelled. At two of the outlets, the products were not clean and this made the labels difficult to read. At one FSU, some expired items of a single veterinary medicinal product were displayed for sale (2 years had passed since the expiry date).

At all the FSUs, the products were securely stored in a single locked steel cupboard (Figure 4.10). The products were effectively protected from sunlight. However, there was no air conditioning in the room and the temperature varied according to the outside temperature, which could become very hot in the summer.

Figure 4.10: Cupboard used to store veterinary medicinal products

Since all the products were kept together in one cupboard, there was not enough space to separate poisonous substances, such as dips, from the other medicinal products. Other poisonous substances, such as rat and snail poison were also sold and kept in the same cupboard.

The majority of the Administration Clerks kept good records of the receipt and sales of the veterinary medicinal products. Only at one outlet were the records not up to date. All products received from Agriserve were recorded in a receipt book and sales were recorded in an invoice book. At the end of each month the remaining stock was checked to ensure that all could be accounted for.

The Administration Clerks were responsible for the sale of the veterinary medicinal products. The Animal Health Technicians were most often in the field and therefore not available for consultation for farmers wishing to purchase products for their animals. The Administration Clerks were therefore often asked for advice. None of them had any formal training on how to handle and store veterinary drugs properly or about livestock health. One Administration Clerk indicated that she was able to give some advice because she had worked as a bookkeeper at a farmers' co-operative where she had learnt about the stock remedies sold there.

None of the FSUs had any refrigerators in working order to store thermolabile products such as vaccines. Each FSU had a refrigerator, but these were gas operated and no gas was available. The refrigerators belonged to the Directorate of Veterinary Services, which was no longer involved in the sale of veterinary medicinal products. Therefore, gas had not been ordered to replenish the supply.

At two FSUs the researcher was shown several boxes of vaccines packed in the bottom of the cupboard, which were to be discarded because they had not been stored properly.

On two occasions, frustrations were encountered when trying to visit an FSU outlet. Once the researcher had to return to the outlet repeatedly before being able to evaluate the outlet because the Administration Clerk was not available. At another FSU, the key for the cupboard containing the veterinary medicinal products could not be found and the outlet had to be revisited at a later stage.

4.4.2 Farmers' co-operatives

The results of the visits to the farmers' co-operatives in Zeerust, Swartruggens and Skuinsdrif are summarised in Table 4.13.

Table 4.13: Evaluation of farmers' co-operatives in Zeerust, Swartruggens and Skuinsdrif (n=3)

Inspection criteria	Number of co-ops
All remedies sold in their original packaging	3
Unregistered remedies sold	0
Scheduled remedies sold	0
Remedies stored securely away from the general public	3
Remedies effectively protected from sunlight	3
Remedies adequately labelled with relevant indications, instructions and warnings	3
Expired stock displayed for sale	0
Remedies in clean condition and labels clearly visible	2
Remedies subdivided	2
Remedies displayed according to therapeutic groups	2
Refrigerator available to store thermolabile products	3
Poisonous substances separated from other products	1
Display clearly visible and attractive	2
Ambient temperature in display and storage areas monitored regularly and controlled	3
Adequate shelving	3

The remedies were displayed according to therapeutic groups at all except one farmers' co-operative. At this outlet some items were dirty, which made the labels difficult to read. At two outlets there was no separation of poisonous substances from the other products.

All the farmers' co-operatives had refrigerators to store thermolabile products. These refrigerators were fitted with thermometers and maintained temperatures between 2-8 °C. The ambient temperatures in all the co-operatives were controlled with air conditioning and, although exact temperatures were not determined, they were on a subjective basis cooler than the outside temperature.

Interviews with the staff of the farmers' co-operatives were not possible and their training could therefore not be determined.

4.4.3 Sales of veterinary medicinal products at the Frontline Service Units

The total sales of veterinary medicinal products by the FSU outlets for 1999 were 396 units. Of these, 17 were not veterinary medicinal products (herbicides, disinfectants etc.). Nine (9) items were administration devices such as spray guns, needles and syringes. The proportions of the different types of veterinary medicinal products sold are illustrated in Figure 4.11. These proportions are compared to the percentage of occasions at which these types of products were mentioned at the interviews with the farmers.

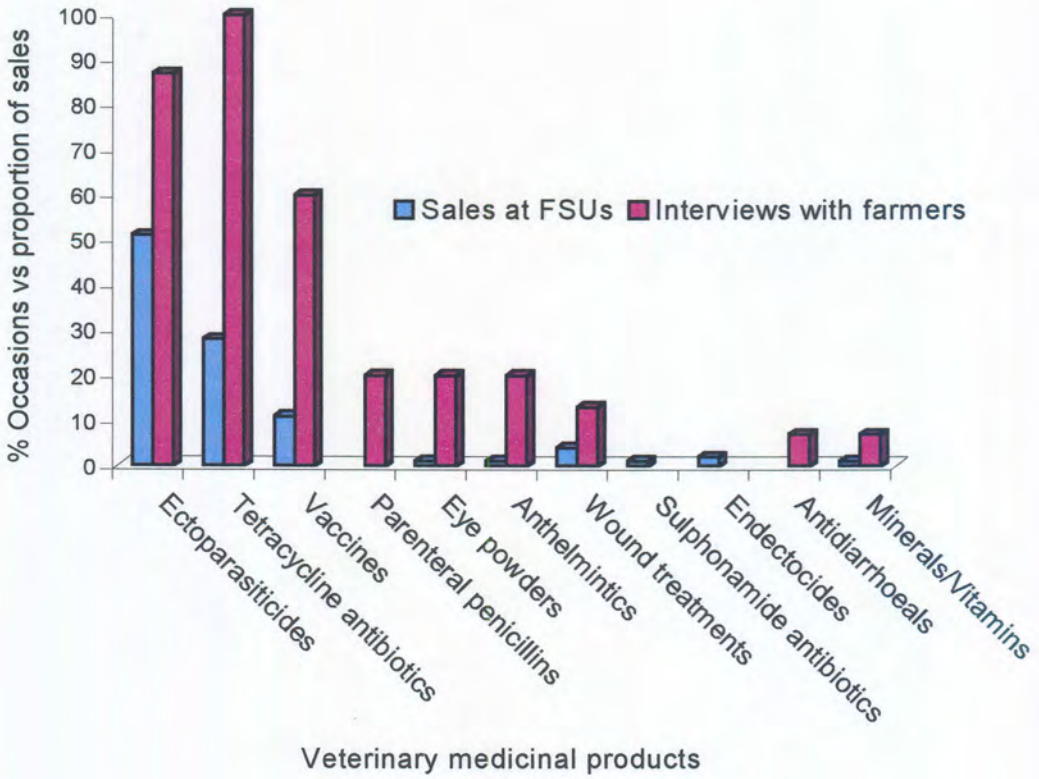


Figure 4.11: Relative sales of the different types of veterinary medicinal products at the FSU outlets, compared to the responses of the farmers during interviews

Tetracycline antibiotics and ectoparasiticides were mentioned most frequently by the farmers and also made up the greatest proportion of stock remedies sold at the FSU outlets. Although the farmers mentioned Tetracycline antibiotics slightly more frequently, ectoparasiticides made up the largest proportion of the FSU sales. This is most likely because ectoparasiticides are used in large quantities on a regular basis. Other notable products are the parenteral penicillins, which the farmers could only purchase from pharmacies with a veterinary prescription due to its scheduling status and are therefore not

reflected in the FSU sales.

The quantities of vaccines sold by the FSU outlets appear to be less than would be expected from the responses of the farmers. This serves to strengthen the comments of the farmers about the availability of vaccines at the FSUs and the observations that these outlets did not have the necessary facilities to store thermolabile products correctly.

The largest proportion of the products sold was ectoparasiticides. In Figure 4.12, the proportions of the different types of ectoparasiticide formulations sold are compared to the percentage of occasions at which farmers mentioned using that formulation.

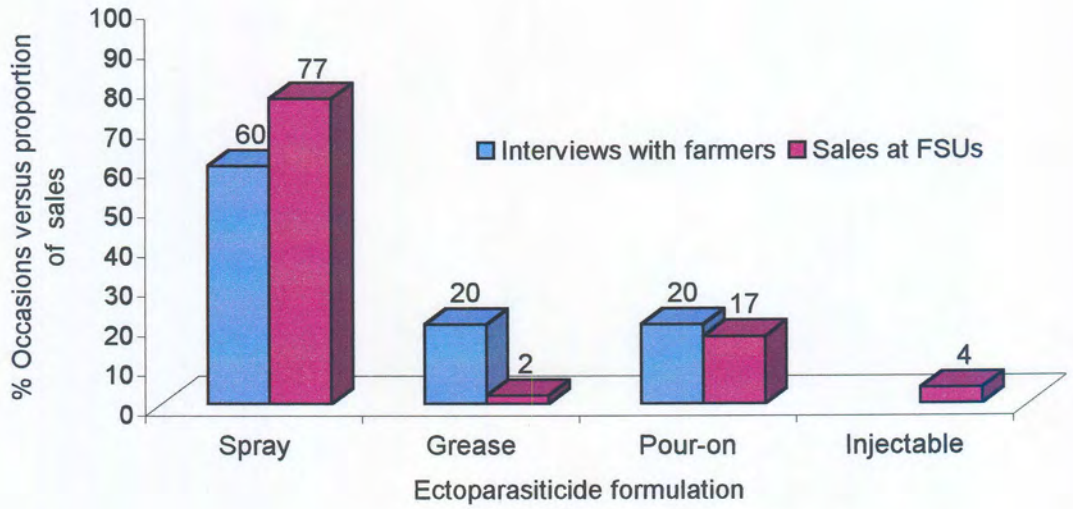


Figure 4.12: Proportions of different formulations of ectoparasiticides sold compared to the responses of the farmers

The largest proportion of ectoparasiticide sold was spray formulations. This is in accordance with the responses of the farmers who said that they preferred sprays mainly because they were cheaper. The proportion of pour-on formulations sold is also in accordance with the responses at the interviews. Less grease was sold than one would expect from the responses at the interviews. Some injectable endectocides were also sold although these were not mentioned at any of the meetings. These products are expensive and are probably only bought by certain individual farmers.

The sales of Tetracycline antibiotics were only slightly less than the sales of ectoparasiticides, which correlates well with the responses of the farmers. Sixty percent (60%) of the Tetracycline preparations sold were the innovator product, whereas the forty percent (40%) were of generic origin. This is despite the innovator products being more expensive than the generic products.

No antiprotozoals were sold at the FSUs and only three percent (3%) of the total amount of veterinary medicinal products sold was anthelmintics.

The annual sales for 1999 for each of the FSU outlets in the Madikwe District are depicted in Figure 4.13. The size of the pie chart at each outlet represents the relative amount of veterinary medicinal products sold there. Each pie chart has also been subdivided according to the proportions of the different types of products sold. The proximity of each of these

outlets to the other villages in the district, as determined by proximity analysis using the Spatial Analyst of ArcView GIS Version 3.2 for Windows®, is also illustrated.

The outlet at Pella sold the most veterinary medicinal products in 1999.

The outlets at Pitsedisule jang and Obakeng both sold the second highest amount of stock remedies in 1999. These outlets served the villages in the northern parts of the district, which are considerable distances away from the larger towns, including the farmers' co-operatives and pharmacies.

The sales at the outlet at Manamela were second poorest for the district, although this outlet appeared to serve a considerable number of villages. Most of these villages were to the south of Manamela, which made it difficult for farmers to travel to this outlet because public transport ran from north to south towards the larger towns.

Sales at the outlet at Brakkuil were the lowest. This outlet appeared to serve only Madikwe Town, which is considered to be functionally urban with a relatively small proportion of the inhabitants involved in livestock production. Also the farmers' co-operative at Skuinsdrif is within 15 km from Brakkuil, making it relatively easily accessible to the farmers in this area.

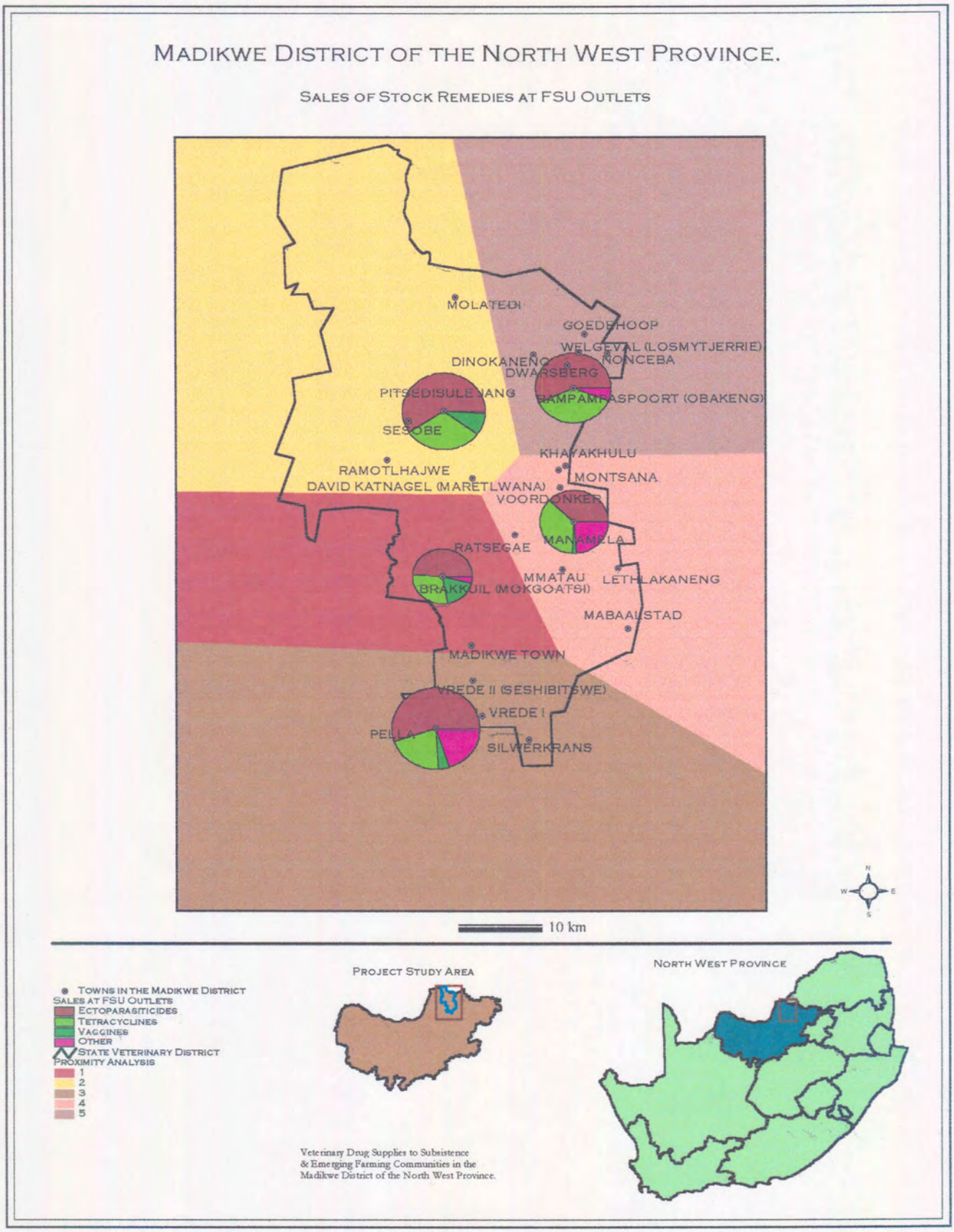


Figure 4.12: **Sales of the FSU outlets for 1999 compared to their proximity to other villages in the Madikwe District**

At all the outlets, except for Brakkuil, more than 50% of the products sold were ectoparasiticides. More than 25% of the products sold at all the outlets, except Pella, were Tetracycline antibiotics. At Pella and Manamela, a considerable proportion of the products sold included vitamins, rumenotorics and wound treatments (classified as 'other' in Figure 4.13). Vaccines made up a negligible proportion of the total sales at all the outlets, except Brakkuil.

The total income for the FSU outlets for 1999 was R 31 083,00. Since 10% was added to the price at which Agriserve purchased the products from the farmers' co-operatives, R 3 108,30 would be available to cover the transport costs for this service.

4.5 QUESTIONNAIRES TO PHARMACEUTICAL COMPANIES

4.5.1 Responses

Eight (8) pharmaceutical companies and one distributing company responded to the questionnaire.

4.5.2 Strategies to market products to emerging farmers

Figure 4.14 summarises the strategies used by the responding pharmaceutical companies to market their products to emerging farmers.

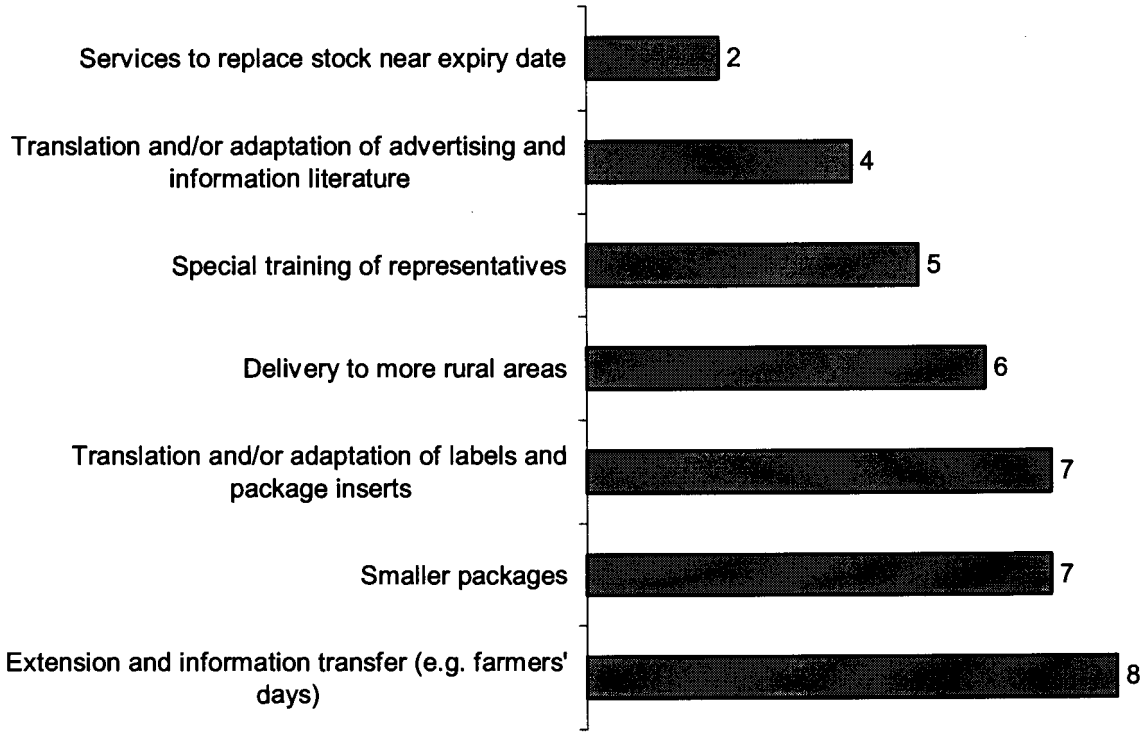


Figure 4.14: Marketing strategies used by responding pharmaceutical companies.

The majority (8) of the responding pharmaceutical companies used extension and the transfer of information to market their products to emerging farmers. The method of information transfer was not specified by any of the companies. A large proportion (7) also made use of smaller packages and the translation of labels and package inserts. Six (6) of the responding companies indicated that they delivered products in rural areas.

Only four (4) companies translated or adapted their promotional and information material and only two companies offered the service of replacing stock that was close to expiry.

Five of the respondants (slightly more than 50%) indicated that their marketing efforts had helped to increase sales and profits considerably, whereas two companies only noticed

marginal increases. The respondent from one company was of the opinion that marketing efforts had not contributed to increases in sales at all, and the respondent from the remaining companies could not yet comment since the strategies had not yet been implemented for long enough.

Those companies that indicated a considerable increase in sales and profits had two marketing strategies in common *viz.* the translation and/or adaptation of labels and package inserts and specialized training of their sales representatives. Those companies that indicated increased sales and profits employed an average of 5 different marketing strategies, whereas those that did not indicate increases employed an average of 3,75 different marketing strategies.

4.5.3 Routes of supply of products

The different routes of distribution of veterinary medicinal products to emerging farmers used by the responding pharmaceutical companies are summarised in Figure 4.15.

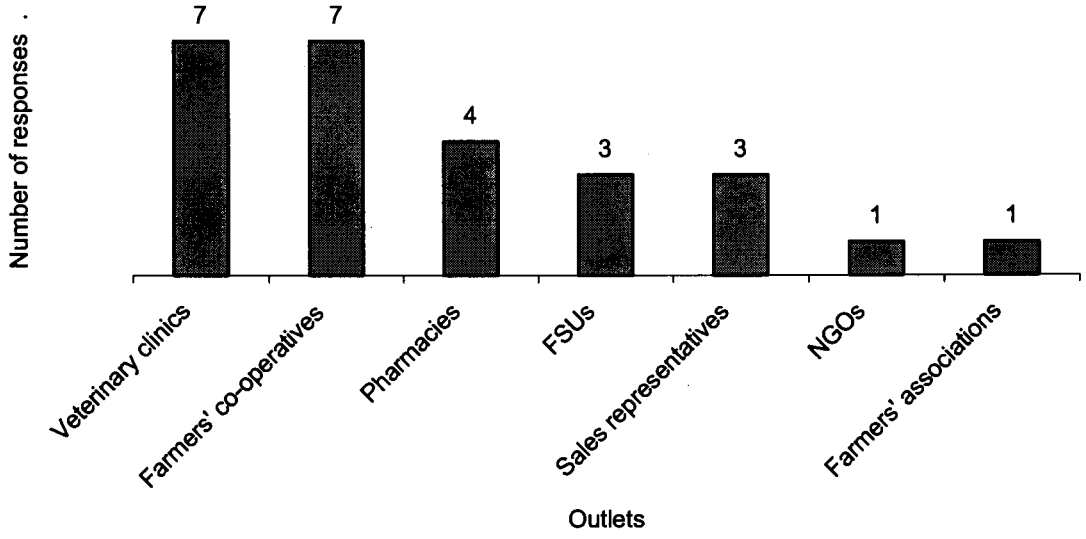


Figure 4.15: Outlets used by companies for their products

Veterinary clinics, farmers' co-operatives and pharmacies, which are the outlets traditionally used under the system of distribution of veterinary medicinal products in South Africa, were mentioned by the majority of the responding companies. Only a few companies mentioned alternative methods of distribution.

A respondent from one company mentioned that migrant workers often purchased products in the mining towns to take home with them.

4.5.4 Challenges encountered by pharmaceutical companies

The challenges that respondents mentioned encountering are summarised in Figure 4.16.

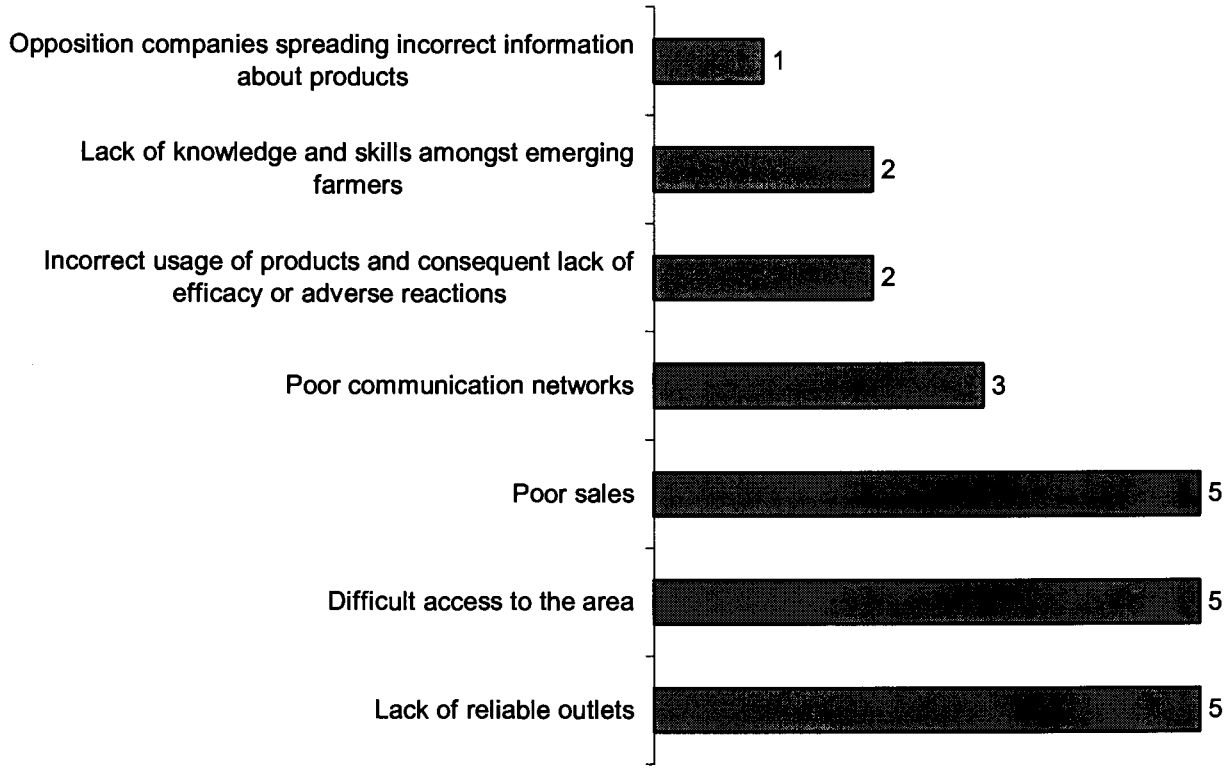


Figure 4.16: Constraints encountered by pharmaceutical companies

The most commonly-mentioned constraints were lack of reliable outlets, difficult access to the area and poor sales. One respondent mentioned that although a need for a product can be created through the dissemination of information and education, there were still logistical problems of supply that had to be overcome.

CHAPTER FIVE

GENERAL DISCUSSION AND CONCLUSION

5.1 RESEARCH METHODOLOGY

An exploratory, qualitative, descriptive case study was conducted to gain an understanding of the supply of veterinary medicinal products to emerging and subsistence farmers in South Africa. Very little was known about the situation prior to commencing the study, which meant that the research questions could not be narrowly defined in advance. A combination of methods was used to collect data *viz.* focus groups, self-administered questionnaires and direct observation. Initial interviews were held with key individuals (*viz.* State Veterinarian, District Manager of the Directorate of Field Services and bookkeeper of Agriserve) to gain an overview of the situation.

Convenience sampling was used because a lack of up-to-date demographic data for the district made it impossible to randomly select respondents. Additionally, poor infrastructure would have made it difficult and time-consuming to interview respondents individually. Animal Health Technicians (AHTs) and Extension Officers (EOs) were therefore asked to arrange meetings, at which farmers were interviewed. The farmers attending these meetings were likely to be those who had regular contact with the employees of the Directorates of Veterinary and Field Services. Also, the AHTs and EOs acted as interpreters during the meetings, which may have discouraged some farmers to openly criticise them. Quantitative analysis of the results of this study may be biased towards a more favourable perspective of the veterinary and extension services available to the farmers in the district due to these

sampling and interview techniques. The results should therefore be seen as sketching the best-case scenario regarding the supply of veterinary medicinal products and animal health services to the farmers of the Madikwe District.

The focus groups were a successful technique for gathering information. In the larger groups, like the one interviewed at Pitsedisule jang (Table 4.1), certain individuals tended to dominate the discussions. These individuals were mostly male and appeared to have considerable social status. However, there was discussion amongst the group before answering the researchers' questions, which means that the views expressed most likely represented a consensus opinion. On several occasions, individuals within the group protested if they did not agree with the opinion being expressed. This person's opinion was then also recorded. It can therefore be accepted that the responses received were representative of the views of the majority of the farmers attending the meetings.

The use of various sources to gather data, as described in the Rapid Rural Appraisal methodology (Beebe 1995), allowed the researcher to examine the supply and use of veterinary medicinal products from different points of view and to confirm certain responses or observations. This helped to ensure the validity of the results of the study.

The lack of a multi-disciplinary team of researchers was a limitation in this study. Although the methods used to collect data were adapted as the study progressed (iteration), discussion between members of a research team as to additional methodology and lines of inquiry was not possible. Collaboration with sociologists, agricultural scientists and economists must be encouraged in future studies, as this will provide alternative insights which that help to find

a holistic solution to the question of the supply of veterinary medicinal products to emerging and subsistence farmers.

The methods of supply of veterinary medicinal products and the needs of subsistence and emerging farmers are likely to vary in different parts of South Africa. This would be due to differences in the available infrastructures, incidence of livestock diseases, predominant livestock species and type of animal husbandry systems. To gain overall insight into the supply of veterinary medicinal products to subsistence and emerging farmers, similar studies will be required in a number of representative areas throughout South Africa. Rapid Rural Appraisal methods could be adapted for each situation.

The main purpose of Rapid Rural Appraisal is to extract and collect information for the purpose of describing and understanding a situation (Chambers 1992). Issues identified during these studies then form the basis of community development projects in the future. Participatory Rural Appraisal is an alternative methodology that should be considered for such studies. Participatory Rural Appraisal basically uses the same tools as Rapid Rural Appraisal for collecting information (Chambers 1992). However, the role of the researcher shifts from investigator to facilitator, thus empowering people to seek and implement their own solutions to a particular problem. This methodology would be suitable for researchers who wish to become intimately involved with a community for an extended period of time.

5.2 ADEQUACY OF SUPPLY IN THE MADIKWE DISTRICT

The OIE has recommended that an adequate system of distribution of veterinary medicinal products should ensure correct storage, and safe and effective use of these products (*Anon.*

1995). To achieve this, it has been suggested that channels of distribution be authorised and that professional veterinary supervision be maintained by requiring a prescription for the sale of certain products. Products requiring a veterinary prescription would include: those intended for the treatment of diseases that cannot be readily diagnosed by laymen; those in which misuse could be dangerous for the animal, handler or consumer of the animal product; those which require special handling or storage (e.g. vaccines); and those in which improper dosage could create resistance (e.g. antimicrobials) (Leonard, Koma, Ly and Woods 1999). The importance of labelling products in a manner that will ensure safe and effective use has also been highlighted (*Anon.*1995).

The system of distribution of veterinary medicinal products through FSU outlets in the Madikwe District was not under the control of a veterinarian, nor was there a system of authorisation in place that would have helped to maintain veterinary control. Furthermore, the original source of the products could not be verified since they were obtained from retail outlets in the surrounding larger towns and not from an authorised supplier. The majority of products sold appeared to be appropriate for the types of livestock diseases that would potentially be prevalent in the district. However, most farmers appeared unable to accurately recognise important livestock diseases, although products for the treatment of these diseases were available to farmers without requiring the prescription of a veterinarian. Numerous examples of misuse and adverse events associated with the use of veterinary medicinal products indicated that adequate information was not supplied to the farmers to ensure safe and effective use of the products they bought. The FSU outlets did not have adequate facilities to store these products correctly. The supply of veterinary medicinal products to emerging and subsistence farmers of the Madikwe District could therefore not be considered adequate.

The majority of products sold by the FSU outlets were ectoparasiticides. Tetracycline antibiotics made up the second largest proportion of the total amount of products sold at the FSUs. Tetracyclines are broadspectrum antimicrobial drugs that can be used to treat a wide variety of non-specific bacterial infections. They are also used specifically for the treatment of Heartwater and Anaplasmosis (Coetzer, Thomson and Tustin 1994).

The OIE Draft Technical Guidelines for the Responsible and Prudent use of Antimicrobial Agents in Veterinary Medicine, drafted in 2000, suggest that, wherever possible, antimicrobial drugs should be used only under the prescription and direct supervision of a veterinarian. The relatively large quantities of Tetracycline antibiotics sold over the counter to the emerging and subsistence farmers of the Madikwe district should therefore receive consideration. The practicality of limiting the availability of these products to supply only by veterinary prescription is questionable in rural communities. Epidemiological studies and risk-benefit analyses could help to motivate for the wider distribution of these products.

The contribution of veterinary use of antimicrobials to the development of microbial resistance in developing communities is uncertain. Few studies have been done to investigate microbial resistance and correlate this with patterns of usage in livestock. One reported study found the level of resistance to be lower in the developing country Zimbabwe compared to First World Countries such as Australia and the USA (Leonard, Koma, Ly and Woods 1999). This could possibly be ascribed to lower levels of usage. However, further studies should be conducted to investigate the development of resistance to antimicrobials used in livestock in developing farming communities. Other issues such as tissue residues and human exposure should also be considered.

Vaccines made up a very small proportion of the total sales of the FSUs in the Madikwe District, despite the fact that these products are considered important for farmers at the subsistence level (Lobry 1989). The responses of farmers at the meetings suggested that they did indeed buy more vaccines than could be attributed to the sales at the FSUs. These vaccines would have been purchased from farmers' co-operatives in the larger towns. The most likely reason for these low vaccine sales would have been that the FSUs did not have adequate facilities to store these thermolabile products correctly.

Veterinary medicinal products must be stored correctly both at the outlets and after purchase, to maintain their quality, effectiveness and safety. The FSU outlets did not have adequate facilities to store thermolabile products, such as vaccines, correctly. Furthermore, the single cupboard in which all products were kept made it impossible to separate medicinal products from poisonous substances. Few farmers were aware of the importance of handling thermolabile products correctly during transport. However, the majority of the farmers indicated that they stored veterinary medicinal products correctly at home. Some of them did not have the facilities to store thermolabile products correctly but tried to keep them as cool as possible by storing them on a cool cement floor.

The Pella outlet, at which the State Veterinarian held a regular weekly clinic, sold a more diverse range of veterinary medicinal products and less tetracycline antibiotics compared to the other FSU outlets. Farmers in this area may have been applying more effective preventative measures and therefore required less curative antibiotics. The use of feed supplements and remedies such as wound treatments suggest that these farmers were

practising a better level of animal care. This could be a positive reflection on the influence of regular contact and consultation with a veterinarian.

The majority of the farmers of the Madikwe district showed a poor ability to accurately identify diseases in their livestock. Farmers listed many specific diseases, which could potentially occur in the Madikwe district (Coetzer 1996; Department of Agriculture North West Province 1998). However, the symptoms they used to recognise these diseases were mostly non-specific or indicative of advanced disease. Some farmers could only list symptoms and were unable to correlate these to a disease. The study method used does not allow for a quantitative analysis of the ability of farmers to recognise important stock diseases accurately. It will be necessary to conduct further studies to address this issue.

Farmers mentioned several examples of misuse of veterinary medicinal products and adverse reactions. One of the reasons offered for misuse of products was that they could not afford to purchase adequate quantities and therefore used smaller volumes than indicated. The responses of the farmers did not support the observations of McCrindle (1996) that the volumes of products sold were too large. However, some farmers did mention that they purchased larger multiple dose volumes because they had to travel far to outlets, and that it would be useful if smaller volumes could be made available from an easily accessible outlet that was closer. Many farmers also said that they were unable to accurately determine the weight of their animals, which could lead to incorrect doses being administered.

The examples of misuse and adverse reactions indicate that products were not supplied to farmers of the Madikwe district together with adequate information to ensure their safe and effective use. The current package insert format for stock remedies did not convey

information effectively. Farmers preferred a simple, pictorial format and the importance of using their home language was highlighted. Other methods of information transfer included farmers' days and extension workshops. These appeared to be particularly effective, possibly because meetings and discussions are an integral part of the Tswana culture (Harman 1984). Farmers regarded their peers as the most valuable source of information about livestock health and veterinary medicinal products. Alternative methods of information transfer, such as printed matter and radio, were poorly developed.

The sales of veterinary medicinal products from the FSU outlets were low. A total of 396 units were sold over a period of one year, although there were approximately 2000 communal farmers in the Madikwe district who were potential clients for these outlets. If a different farmer bought each item that was sold, only 20% of the farmers could have purchased products from the FSU outlets during 1999. However, since it is likely that those farmers that purchased veterinary medicinal products from the FSUs would purchase more than one item, the percentage of communal farmers making use of the FSU outlets is possibly considerably less than 20%. Total sales would need to increase in the Madikwe district to make the sale of veterinary medicinal products viable for potential privatisation.

A large proportion of the farmers who were interviewed still travelled to farmers' co-operatives and pharmacies in the larger towns, despite efforts to make veterinary medicinal products available at FSU outlets within the Madikwe district. The substantial number of negative comments made about the FSU outlets concerned the availability of necessary products and quality of the service and quality and affordability of the products sold.

The FSU outlets were not easily accessible to all farmers of the Madikwe district. The position of the outlets were not ideal (Figure 4.14) and the nature of the public transport system in the Madikwe District made it difficult for the farmers to travel within the district. Farmers who did not live in a village with an FSU outlet often found it easier to travel to the farmers' co-operatives and pharmacies in the larger towns, particularly since this could be combined with shopping or business. A distribution system for veterinary medicinal products to these farmers should therefore ideally have outlets that are easily accessible to farmers in every village of the district.

The results of the survey among pharmaceutical companies indicated that the majority of the companies had created a need for their products through promotion, packaging and information transfer. However, only a few were involved in the logistics of the distribution of their products and most relied on traditional outlets such as veterinary clinics, farmers' co-operatives and pharmacies. One pharmaceutical company was involved in the delivery and distribution of its products. This company sold an innovator oxytetracycline antibiotic product and sales of this product were higher than the combined sales of all the generic alternatives, despite the generic products being considerably cheaper. This is likely to be due to good marketing efforts and product branding by the innovator company but could also be attributed to the better service offered by this company. The products were delivered directly to Madikwe Town and items that were close to expiry were collected and sold at faster moving markets.

5.3 PROPOSED REQUIREMENTS FOR DISTRIBUTION AND SUPPLY

A system of supply of veterinary medicinal products to subsistence and emerging farmers should make the products more readily available, whilst maintaining an adequate level of control to ensure safe and effective use. A pyramidal system of primary animal health care, as suggested by Hohn and Williams (1997), could help to attain wider distribution, whilst ensuring that relevant information and advice are supplied together with the veterinary medicinal products. The pyramidal structure would be under the ultimate control of a veterinarian or group of veterinarians, with formally trained paraveterinary professionals such as Animal Health Technicians (AHTs) and veterinary nurses at the intermediate level. Livestock owners with informal training could form the wide base of the pyramid.

The pyramid of primary animal health care would need to be supported by relevant policies, legislation and systems of authorisation.

Paraveterinary professionals could play an important role in the distribution of veterinary medicinal products within a primary animal health care system. They could be granted the privilege to sell certain categories of scheduled veterinary medicinal products without the direct instructions of a veterinarian, provided they were registered with the relevant professional regulatory body. The regulatory body would grant him/her this privilege based on evidence of adequate training.

Farmers in the Madikwe District considered their peers to be the most important source of information about livestock diseases and the veterinary medicinal products used to treat them. This could be embraced as an opportunity to disseminate information and veterinary

medicinal products amongst emerging farmers within the structure of a primary animal health care programme. Selected farmers, who are respected and influential in the community, could receive training and be allowed to distribute veterinary medicinal products together with information. This would be similar to the Community-Based Animal Health System in East Africa and the Basic Animal Health Scheme in Malawi (Catley and Leyland 2001, Hűttner, Leidl, Jere and Pfeiffer 2000, De Haan and Bekure 1991).

Large distances, poor infrastructure and relatively low sales are likely to hinder the privatisation of the distribution of veterinary medicinal products to emerging farmers. Under such circumstances, it is regarded as acceptable that the State provides the infrastructure for the distribution of products that are generally considered to be 'private good', albeit on a cost-recovery basis (Leonard, Koma, Ly and Woods 1999). It is hoped that greater availability of veterinary medicinal products to treat important livestock diseases will improve the level of livestock production by emerging farmers, which in turn would stimulate the development of private veterinary practice, ultimately lifting the burden from the State.

Veterinarians and AHTs in the employ of the State could be allowed to supplement their incomes through the sale of veterinary medicinal products, as suggested by Leonard, Koma, Ly and Woods in 1999. The advantages of such a system would be that the correct types of products will be sold to the farmers, advice would be given together with the product and existent infrastructure and assets, such as vehicles, could be used to distribute the products to the farmers more widely and not only through outlets in selected villages. The financial incentive may stimulate the veterinarians and AHTs to provide the farmers with better service.

Such a system would only be possible if the policy of the Directorate of Veterinary Services allowed their employees to make use of state property to generate a supplementary income. Unfortunately the temptation for employees to neglect their official duties in pursuit of own personal gain may prevent the State from making such allowances. It is also possible that veterinarians and paraveterinary professionals could exploit the farmers by persuading them to buy unnecessary products. However, it is in the interest of veterinarians and paraveterinary professionals to maintain good relationships with the farmers in the area in which they work. The limited resources of emerging and subsistence farmers also make it unlikely that they could be persuaded to purchase unnecessary products.

All outlets for veterinary medicinal products within the primary animal health care system should be authorised and receive certification, as advocated by the Veterinary Products Policy Committee. Pre-requisites for certification would include adequacy of facilities, staff and the keeping of adequate records. In this way, alternative outlets, such as rural shops, can be pursued on condition that they fulfil the requirements for certification and fall within a primary animal health care programme.

An appropriate scheduling system and the compilation of an Essential Veterinary Drug List (EVDL) would support a system of supply of veterinary medicinal products as described above. A scheduling system whereby certain products are classified as Animal Health Products for supply to farmers through authorised outlets, as advocated by the National Veterinary Drug Policy, will help to maintain adequate control, whilst making it possible to distribute these products widely. Veterinary medicinal products for the treatment of economically important livestock diseases would be listed in an EVDL, together with

important information regarding the diagnosis of these diseases as well as the handling and use of the products. The EVDL would serve to aid policy-makers in decisions regarding the registration, scheduling status and availability of these products.

Decisions regarding the types of veterinary medicinal products that appear in the EVDL and are to be registered as Animal Health Products should be based on epidemiological studies of the incidence and prevalence of economically important livestock diseases throughout South Africa as well as risk-benefit and cost-benefit analyses. The types of products that are to be made available in a particular district should reflect the types of animals kept, the prevalence and incidence of economically important diseases as well as the level of production.

In the Madikwe District, the majority of livestock are cattle, goats and sheep (Bosman 1995). Unfortunately, the incidence and prevalence of livestock diseases in this district could not be ascertained, due to poor records. The important livestock diseases of these species in South Africa, as listed by Coetzer in 1996, together with the veterinary medicinal products required for their treatment are listed in Tables 5.1, 5.2 and 5.3. This list of products can be considered to be comprehensive for the whole of South Africa and should contain most of the veterinary medicinal products needed by the farmers of the Madikwe District. However, this list should be adapted for specific areas in South Africa as information from epidemiological studies becomes available.

Table 5.1: Veterinary medicinal products required for the treatment of important diseases of cattle in South Africa.

Livestock disease	Veterinary Medicinal Products required
Foot-and-Mouth Disease	Vaccine
Heartwater	Tetracycline antibiotics Supportive therapy Vaccine Ectoparasiticides
Babesiosis	Antibabesials (diminazene, imidocarb) Supportive therapy Vaccine Ectoparasiticides
Lumpy Skin Disease	Vaccine Supportive therapy
Rift Valley Fever	Vaccine Supportive therapy
Mastitis	Antimicrobials (topical and systemic) Ectoparasiticides (if due to tick damage) Antiseptics Supportive therapy
Tick Worry	Ectoparasiticides
Helminthiasis	Anthelmintics Supportive therapy
Anaplasmosis	Tetracycline antibiotics Supportive therapy Vaccine Ectoparasitcides
Anthrax	Vaccine

Table 5.2: Veterinary medicinal products required for the treatment of important diseases of goats in South Africa.

Livestock disease	Veterinary Medicinal Products required
Heartwater	Tetracycline antibiotics Supportive therapy Vaccine Ectoparasiticides
Coccidiosis	Anticoccidials Sulphonamide antimicrobials
Orf	Vaccine Antimcirobials
Pasteurellosis	Antimicrobials

Table 5.3: Veterinary medicinal products required for the treatment of important diseases of sheep in South Africa.

Livestock disease	Veterinary Medicinal Products required
Helminthiasis	Anthelmintics
Pulpy kidney	Vaccine
Heartwater	Tetracycline antibiotics Supportive therapy Vaccine Ectoparasiticides
Bluetongue	Vaccine
Rift Valley Fever	Vaccine
Psoroptes mange	Ectoparasiticides Endectocides
Simulium midges	Ectoparasiticides
Coccidiosis	Anticoccidials
Caseous lymphadenitis	Vaccine Antimicrobials

Tetracycline antibiotics and ectoparasiticides are products used for the treatment and/or prevention of a large proportion of the above-mentioned diseases. Many of these diseases can also be prevented by vaccination. At the subsistence and emerging level of livestock production, the prevention of disease should be emphasized (Lobry 1989). Vaccines should therefore receive serious consideration for inclusion in the EVDL. However, it must be remembered that vaccines for some of these diseases, such as Hearwater, Babesiosis and Anaplasmosis, are live whole-blood vaccines and in the case of Heartwater must be administered intravenously, which can cause anaphylactic shock.

The types of veterinary medicinal products that can be used safely and effectively by emerging and subsistence farmers without the direct supervision of a veterinarian is dependent on their level knowledge of animal diseases, animal husbandry and veterinary medicinal products. Farmers' days, intensive workshops, radio and written material are

possible ways of transferring information to farmers. Formularies and handbooks describing important livestock diseases and their treatment in a format that is understandable to emerging and developing farmers could also be published. Furthermore, products must be labelled and supplied with product literature that is understandable to the farmer.

The majority of pharmaceutical companies have recognised their responsibility to develop appropriate product literature and package sizes. Many companies have created an awareness of their products amongst emerging and subsistence farmers through the transfer information at farmers' days and through other forms of advertisement. However, companies must be encouraged to become involved in the distribution of their products to these farmers instead of relying on the traditional routes of supply such as farmers' co-operatives and veterinary clinics.

A study of ethnoveterinary plant use in the Madikwe District revealed that livestock farmers made use of plants to treat disease in their animals (van der Merwe 2000). This potential alternative to orthodox veterinary medicinal products serves to remind us that an integrated solution must be sought to improving the health and production of livestock of emerging and subsistence farmers. Although it may not be possible to follow all the guidelines of international organisations such as the OIE, a practical yet acceptable solution should be sought to the supply of veterinary medicinal products to these farmers. To achieve an integrated solution, it will be necessary to collaborate with sociologists, agricultural scientists and economists. Finally it must be emphasized that emerging farming communities themselves must be actively involved in the entire process.

REFERENCES

Acocks J P H 1988 Veld types of South Africa. *Memoirs of the botanical survey of South Africa* 57: 55-56

Anon 1995 Recommendation No.1 (Distribution of veterinary medicines). *Veterinary Drug Registration Newsletter of the OIE* 9(1): 91

Beebe J 1995 Basic Concepts and Techniques of Rapid Appraisal. *Human Organization* 54 (1): 42-51

Blancou J 1995 The role of the Office International des Epizooties in the international harmonisation of veterinary drug legislation. *Veterinary Drug Registration Newsletter of the OIE* 9(1): 19-20

Bless C, Higson-Smith C 1995 *Fundamentals of Social Research Methods: An African Perspective* (2nd edn). Juta and Co Ltd.

Blum R, Herxheimer A, Stenzl C and Woodcock J 1981 *Pharmaceuticals and Health Policy. International perspectives on provision and control of medicines.* Croom Helm Ltd, London

Bosman A 1995 Socio-Economic Survey Madikwe District. *Conducted and compiled by the Department of Agriculture and Environmental Affairs following a request by District Manager of Madikwe (Chief Zibi)*

Catley F, Leyland T 2001 Community participation and the delivery of veterinary services in Africa. *Preventive Veterinary Medicine* 49: 95-113

Chambers R 1992 *Rural Appraisal: Rapid, Relaxed and Participatory.* Discussion paper: Institute of Development Studies University of Sussex, Brighton

Coetzer J A W, Thomson G R, Tustin R C 1994 *Infectious diseases of Livestock with special reference to Southern Africa* (1st edn). Oxford University Press, Oxford

Coetzer J A W 1996 An overview of the importance of infectious and parasitic diseases in livestock and wildlife in southern Africa. *Proceedings of the second All Africa Conference on Animal Agriculture, Pretoria, South Africa,* 1-4 June 1996: 15-160

Davis L E 1988 Veterinary Pharmacology: An introduction to the discipline. In Booth N H, McDonald L E (eds) *Veterinary Pharmacology and Therapeutics* (6th edn) Iowa State University Press, Ames: 3-8

De Haan C, Bekure S 1991 Animal Health Services in Sub-Saharan Africa: Initial experiences with new approaches. Online. Available: http://www.cgiar.org/ilri/InfoServ/Webpub/Fulldocs/X5518e/X5518e00.htm

De Jager 1996 The constraints of climate, water and soil on animal production. *Proceedings of the second All Africa Conference on Animal Agriculture, Pretoria, South Africa,* 1-4 June 1996: 25-42

Department of Agriculture North West Province Annual report for the period of 1st January to 31st December 1998. *Prepared by the Directorate of Veterinary Services*

Developmental Research 1993 *Madikwe Game Reserve: baseline survey and preliminary investigation into community attitudes towards the reserve and other socio-economic needs*. Report commissioned by the Development Bank of South Africa, November 1993

Dina O A, Arowolo R O A 1991 Some considerations on veterinary drug use and supply in Nigeria. *Revue d'elevage et de medicine veterinaire des pays tropicaux* 44 (1): 29-31

Dreyer K, Fourie LJ , Kok D J 1999 Assessment of cattle owners' perceptions and expectations, and identification of constraints on production in a peri-urban , resource-poor environment. *Onderstepoort Journal of Veterinary Research* 66: 95-102

Fidler D P 1998 Legal issues associated with Antimicrobial Drug Resistance. *Emerging infectious diseases* 4 (2). Online. Available: wysiwyg://52/http://www.cdc.gov/ncidod/eid/vol4no2/fiddler.htm

Harman F J N 1984 *Pula I, Tswana Grammar* (2nd edn). F J N Harman publishers, Groenkloof

Hohn E, Williams J H 1997 Veterinary community health: an emerging discipline. *Journal of the South African Veterinary Association* 68 (2): 32-34

Hüttner K, Leidl K, Jere F B D, Pfeiffer D U 2000 Characteristics and performance of village animal health workers and veterinary assistants in northern Malawi. *Journal of the South African Veterinary Association* 71 (3): 160-165

Jukes D 2000 The International Dimension of Food Law. Online. Available: http://www.fst.rdg.ac.uk/foodlaw/fs652/intern.htm

Julian R J 1990 Socio-economic imporance of the diagnosis of disease in backyard species in the Caribean. *Canadian Veterinary Journal* 31: 306-307

Krecek R C, Cornelius S T, McCrindle C M E 1995 Socio-economic aspects of animal diseases in southern Africa: Research priorities in Veterinary Science. *Journal of the South African Veterinary Association* 66 (3): 155-120

Leonard D K, Koma L M P K, Ly C, Woods P S A 1999 The institutional economics of privatizing veterinary services in Africa. *Revue scientifique et technique des Office*

International des Epizooties 18 (2): 544-561

Letsoalo S S, Krecek R C, Botha C A J, Ngetu X 2000 Animal husbandry in Moretele I of the North West Province: implications for veterinary training and research. *Journal of the South African Veterinary Association* 7 (2): 5-8

Lobry M 1989 Distribution of veterinary drugs in developing countries. *Veterinary Drug Registration Newsletter of the OIE* 3(2): 32-34

Lobry M, Boisseau J 1990 Proposals for a legislative text on Veterinary Pharmacy. *Veterinary Drug Registration Letter of the OIE* 4 (2): 5-8

Mather C 1996 Towards sustainable agriculture in post-apartheid South Africa. *GeoJournal* 39 (1): 41-49

Maundu P 1995 Methodology for collecting and sharing indigenous knowledge: a case study. Online. Copuright DIRAN/Nuffic and contributors. Available: http://www.nuffices.nl/ciran/ikdm/3-2/articles/maundu.html

McCrindle C M E, Tice G, Mogajane M E, Stewart C G, Mosupi H 1994 An investigation into the potential veterinary needs of a semi-rural low-income community. *Journal of the South African Veterinary Association* 65 (3): 90-96

McCrindle C M E 1996 Veterinary Needs Appraisal: Mashishing. (Technical Report) Prepared for: Medunsa, SPCA, State Veterinary Services, Civic Association, EJNF, Mpumalanga Parks Board, Private veterinarians – Lydenburg. Published by: CSOU Veterinary Faculty, Medunsa, 0204, Gauteng

McCrindle C M E 1998 Veterinary Needs Appraisal Report: Zuurbekom, West Rand and Veereninging areas Gauteng. (Technical Report) Published by: CSOU Veterinary Faculty, Medunsa, 0204, Gauteng

McCrindle C M E 1999 Veterinary Needs Appraisal Report: Mamelodi East settlement areas. (Technical Report) Published by: CSOU Veterinary Faculty, Medunsa, 0204, Gauteng

OIE World Wide Public Consultation on Antimicrobial Resistance 2000 Draft Technical Guidelines for the Responsible and Prudent use of Antimicrobial Agents in Veterinary Medicine. Online. Available: http://www.affsa.fr/oiecc/abr/Documents/Draft Topic2.htm

Parodi L A 1994 Session 3: Distribtion of veterinary drugs. *Veterinary Drug Registration Newsletter of the OIE* Vol 8(2): 35-60

Stewart C G (ed) 1997 Resources and needs of animal owners at Jericho. (Technical Report) Published by: CSOU Veterinary Faculty, Medunsa, 0204, Gauteng

Sundlof S 1995 International harmonisation of veterinary drug registration requirements. *Veterinary Drug Registration Newsletter of the OIE* (9)1: 27-29

Swan G E, Sykes R D, Schlebusch J 1994 Veterinary drug registration in South Africa: current and future perspectives. *Proceedings of the 6th International Congress of the European Association for Veterinary Pharmacology and Toxicology* Edinburgh, UK 7-11 August 1994: 69-70

Swan G E, Sykes R D and Schlebusch J 1997 Veterinary drug registration and control in South Africa: Current and future perspectives. *Proceedings of the Southern and Eastern African veterinary drug regulatory affairs conference* Pretoria, South Africa 17-20 November 1997 35-37

Swan G E 1997 General registration requirements and procedures in South Africa. *Proceedings of the Southern and Eastern African veterinary drug regulatory affairs conference* Pretoria, South Africa 17-20 November 1997 18-20

Sykes R D 1995 Overview of veterinary drug control in South Africa. *Registration procedures of veterinary medicines and stock remedies in South Africa prepared by the Department of Pharmacology and Toxicology, Faculty of Veterinary Science, University of Pretoria*

Sykes R D 1997 The importance of harmonisation in the African Context. *Proceedings of the Southern and Eastern African veterinary drug regulatory affairs conference* Pretoria, South Africa 17-20 November 1997 1-2

Umali D L, Feder G and de Haan C 1994 Animal Health Services: Finding the balance between public and private delivery. *The World Bank Research Observer* 9: 71-96

Van der Merwe D 2000 Use of ethnoveterinary medicinal plants in cattle by Setswana-speaking people in the Madikwe area of the North West Province. MSc thesis, University of Pretoria

Van Zyl J, van Rooyen J 1991 Agricultural production in South Africa. In: De Klerk M J (ed) *A harvest of discontent – the South African land question* IDASA, Cape Town: 179-212

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YUNIBESITHI YA PRETORIA

APPENDIX 1

FOR ANIMAL USE ONLY

TETRACYCLINE A®

Injectable solution

Reg. No. G 00000 Act 36/1947

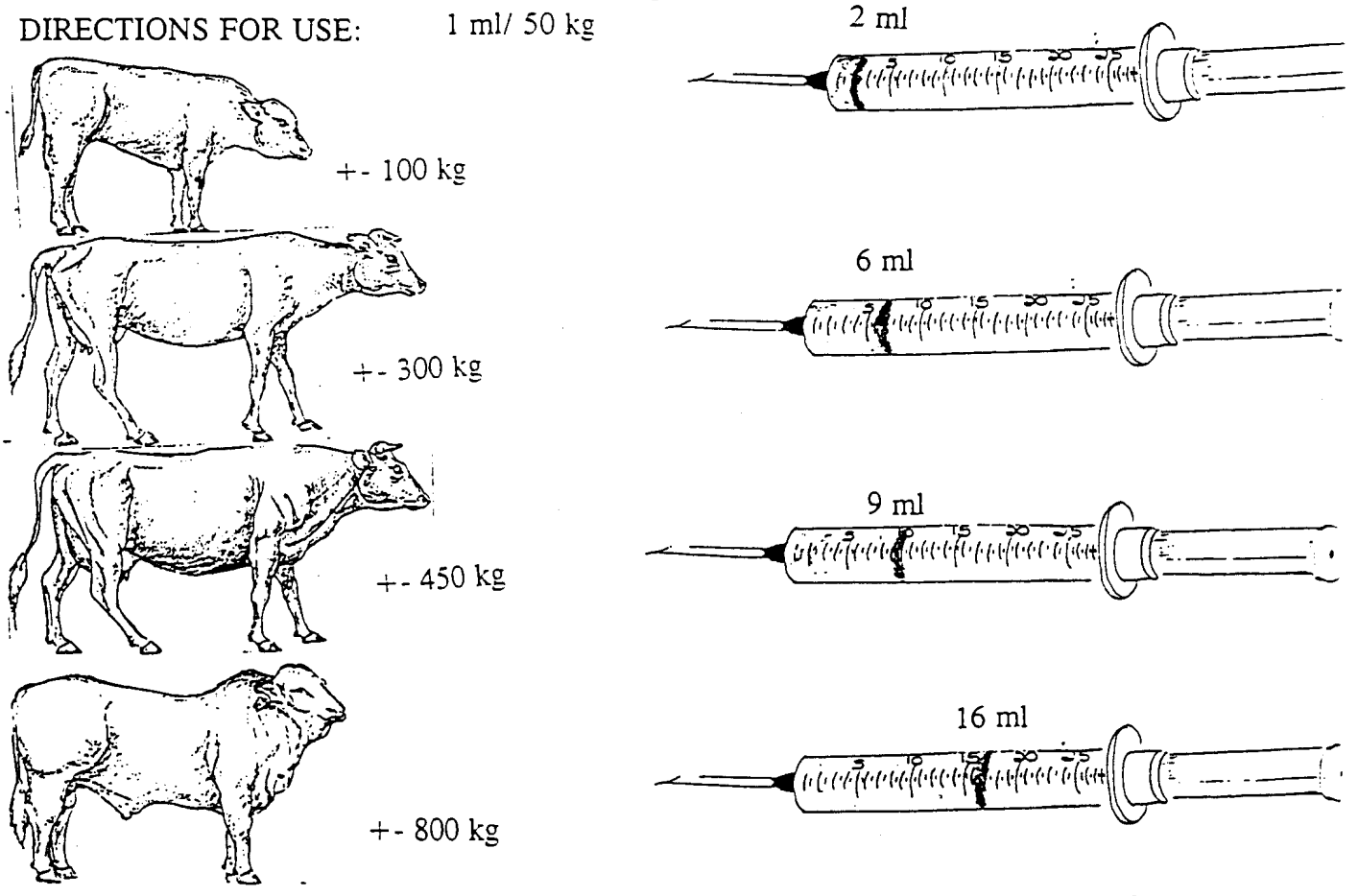
INDICATIONS:

For the treatment of: Anaplasmosis (Bolwetsi jwa gala)
Heartwater (Semmee)
Pneumonia (Bolwetsi jwa makgwafo)
Footrot (Bolwetsi jwa tlhakwana)
Navel-ill
Joint-ill (Bolwetsi jwa ditokololo)
Wound infection

WARNINGS:

1. Use only in: Cattle
   Swine
2. Do not slaughter animals for human consumption within 7 days of last treatment.

DIRECTIONS FOR USE:



Intravenously ☒	Intramuscular ☑	Subcutaneously ☒

APPENDIX 2

CHECKLIST: INSPECTION OF PREMISES

Type of outlet: .....

Locality: .....

	yes	no
Are the staff able to answer questions regarding remedies stocked and advise on their use?		
Are any items of expired stock displayed/sold?		
Are remedies in a clean condition and labels clearly visible?		
Are all remedies adequately labelled with relevant indications, instructions and warnings?		
Is there subdivision of remedies?		
Are poisonous substances seperated from other remedies?		
Are remedies displayed logically?		
Is the display clearly visible and attractive?		
Are remedies effectively screened from sunlight?		
Are all thermolabile remedies stored correctly?		
Is there a refrigerator unit capable of storing products within a selected temperature range of 2-8° C available and is the efficiency of the unit checked regularly?		
Is the ambient temperature in the display and storage areas monitored regularly? (Room T < 25° C)		
Does the facility have a suitable and effective means of temperature and ventilation control?		
Is shelving adequate?		
Are all remedies sold in their original packaging?		
Are any unregistered remedies sold?		
Are any scheduled remedies sold?		
Is there an adequate record-keeping system?		
Are records kept up to date?		
Are remedies stored securely away from general public?		

List of drugs stocked:

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Source of products:

	Always	Some-times	Never	Service G/ A P
Directly from pharmaceutical companies				
Representatives of pharmaceutical companies				
Drug wholesalers				
Other.....				

Rate service of various sources in last column as Good/ Average/ Poor

Describe record-keeping system.

.....
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.....

Qualifications of manager:

.....

Qualifications of sales staff:

.....

Are staff willing to attend courses/ seminars regarding drug handling and use?

Yes/ No

Are employers willing to pay for such courses and give employees leave to attend?

Yes/ No

APPENDIX 3

QUESTIONNAIRE: ANIMAL HEALTH PROFESSIONS

Please note: 'Veterinary Medicines referred to throughout are the old Stock Remedies available over the counter and not the sheduled medicines restricted to prescription use.

QUESTION 1:
What is your profession?

Veterinarian ☐
Animal Health Technician ☐
Extension Officer ☐
Other..... ☐

QUESION 2:
Which district/ area do you serve?

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QUESTION 3:
For how long have you been in service?

..... years

QUESTION 4:
Name the diseases that are prevalent in your area. (Preferably in descending order of prevalence with the disease occuring most often first.).

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QUESTION 5:
Which of these diseases do you consider to be economically important?

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QUESTION 6:
Which of these diseases are farmers able to recognize accurately?

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QUESTION 7:
Which of these diseases are farmers unable to recognize?

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QUESTION 8:
To what extent do the farmers in your area use Veterinary Medicines in the following situations?

To treat infectious diseases (eg. Heartwater, Anaplasmosis etc.)
Always ☐

Sometimes ☐
Never ☐

To treat wounds, abscesses and other localized skin problems
Always ☐
Sometimes ☐
Never ☐

To treat mastitis
Always ☐
Sometimes ☐
Never ☐

To treat external parasites such as ticks
Always ☐
Sometimes ☐
Never ☐

To deworm their animals
Always ☐
Sometimes ☐
Never ☐

To vaccinate their animals against important diseases
Always ☐
Sometimes ☐
Never ☐

Do they use vitamins, tonics and rumenotorics (ie. to aid rumen function in animals that are recovering from diseases like anaplasmosis)
Always ☐
Sometimes ☐
Never ☐

To treat young animals with diarrhoea
Always ☐
Sometimes ☐
Never ☐

Other
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.....
.....

QUESTION 9:

If farmers in your area do not regularly use Veterinary Medicines to treat their stock, what would be the reason?

Expense of the medicines ☐
Availability of the medicines ☐
Lack of knowledge (do not know of the medicines) ☐
Previous bad experience ☐
Other..... ☐

QUESTION 10:
What type of problems have you experienced with farmers treating their own stock with Veterinary Medicines?

Using medicines for the wrong indications
Always ☐
Sometimes ☐
Never ☐

Farmers that are unable to read/ interpret the package insert
Always ☐
Sometimes ☐
Never ☐

Injection site reactions
Always ☐
Sometimes ☐
Never ☐

Foreign body pneumonia due to incorrect dosing
Always ☐
Sometimes ☐
Never ☐

Overdosing and poisoning
Always ☐
Sometimes ☐
Never ☐

Underdosing
Always ☐
Sometimes ☐
Never ☐

Incorrect route of administration
Always ☐
Sometimes ☐

Never ☐

Other
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QUESTION 11:
At what type of outlet do farmers in your area obtain Veterinary Medicines when required?

Farmers' co-op
Always ☐
Sometimes ☐
Never ☐

Pharmacy
Always ☐
Sometimes ☐
Never ☐

State veterinarian
Always ☐
Sometimes ☐
Never ☐

Animal Health Technician
Always ☐
Sometimes ☐
Never ☐

Other
.....
.....
.....

QUESTION 12:
Are there Veterinary Medicines available at your Service Centre?

Yes ☐
No ☐

Used to be but no longer ☐

QUESTION 13:
Who is responsible for these medicines at the Service Centre?

Administration clerk ☐
Animal Health Technician ☐
Extension Officer ☐
Other..... ☐

QUESTION 14:
Do the farmers in your area regularly buy Veterinary Medicines at your Service Centre or do they prefer to travel further afield?

Yes ☐
No ☐
Sometimes ☐

QUESTION 15:
If the farmers rather travel further afield, what is the reason?

Veterinary Medicines are not available at the Service Centre ☐
Would like advice from the sales staff which is not available at the Service Centre ☐
Buy other products as well which are not available at the Service Centre ☐
Staff at the Service Centre are not always available ☐
Other..... ☐

QUESTION 16:
In your opinion, is the availability of Veterinary Medicines to the farmers of your district adequate?

Yes ☐
No ☐

QUESTION 17:
What are your suggestions to improve availability?

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QUESTION 18:
Which pharmaceutical companies are, in your opinion, aiming to provide a better and relevant service to the type of farmer that occurs in your area?

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APPENDIX 4

Questionnaire to the pharmaceutical industry

Question 1:

Which of your products would you consider suitable for marketing to farmers of the developing communities?

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Question 2:

Have you adapted the manner in which you market these products in order to target the farmers of the developing communities?

No	☐
Yes: Smaller packages	☐
Translation and/or adaptation of labels and package inserts	☐
Translation and/or adaptation of advertising and information literature	☐
Extension and information transfer (eg. at farmers' days)	☐
Special training of representitives	☐
Delivery to more rural areas	☐
Services to replace stock near expiry date	☐
Other.....	
.....	
.....	

Question 3:

If you answered 'yes' to the above question, have these adaptations helped to increase sales and profits?

Very much	☐
Slightly	☐
Not at all	☐

Question 4:

Through which channels do you supply your products to farmers of the developing communities?

Veterinary clinics ☐
Farmers' co-ops ☐
Pharmacies ☐
Service-centres/ other satellites of governmental departments ☐
Directly through sales representatives ☐
Non-governmental organizations ☐
Other.....
.....
.....

Question 5:

What challenges have you encountered in serving the developing communities?

Poor sales ☐
Lack of reliable outlets ☐
Difficult access to area ☐
Poor communication networks ☐
Incorrect usage of products and consequent adverse reactions or lack of efficacy ☐
Other.....
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Question 6:
General comments (eg. do you feel that this market is worth pursuing?):
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